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LIVE STOCK

A CYCLOPEDIA

FOR THE FARMER AND STOCK OWNER

INCLUDING

THE BREEDING, CARE, FEEDING AND MANAGEMENT OF
Horses, Cattle, Swine, Sheep and Poultry

WITH

A Special Department on Dairying

BEING ALSO

A COMPLETE STOCK DOCTOR

SPECIAL EDITION

VOLUMES I, II, III, IV, V, VI, and VII COMBINED

BY

A. H. BAKER, M. D., V. S.

Founder and for 27 years Dean and Professor of Theory and Practice of Veterinary Medicine,
Chicago Veterinary College.

ASSOCIATE AUTHORS

HON. JONATHAN PERIAM,

Author Cyclopedia of Agriculture, Etc.

With special contributions from the following professors of the Ontario Agricultural College
of Guelph, Ontario, Canada.

G. E. DAY, B. S. A.

Professor of Agriculture and Farm Superintendent.

H. H. DEAN, B. S. A.

Professor of Dairy Husbandry.

HON. W. D. HOARD,

Editor and Publisher Hoard's Dairyman

J. HUGO REED, B. S. A.

Professor of Veterinary Science

W. R. GRAHAM, B. S. A.

Manager and Lecturer Poultry Department

WITH ONE THOUSAND EXPLANATORY ENGRAVINGS

PUBLISHED BY

INTER-COLLEGIATE PRESS

KANSAS CITY, MO.

1914

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AUTHOR'S INTRODUCTION

THAT knowledge is power is an oft repeated maxim. It is a truism, and that knowledge is safety is quite as great a truth. With these thoughts as an impelling motive this book is written for the farmer and stock owner. It is the purpose to tell them what they should know concerning the details of a great interest—one which pertains to every farm and to every one owning a horse, cow, or other domestic animal. It is time that such book is written. Its facts are given in language such as the unprofessional stock owner can understand, and its remedies are such as he can procure and apply. Its teachings concerning breeds, breeding, training and the general care of live stock—its instructions in the characteristics of the various breeds of all domestic animals—their points of excellence and strength—have both educational and financial value which it is believed should be within the reach of every stock owner.

Since my previous book on the same general subjects was written, many diseases have developed and important advances made in popular veterinary practice. The general demand for all this information has been most manifest and the meeting of that demand would seem to be in the line of imperative duty.

In the veterinary departments special effort has been made to give the causes producing disease, so that knowing the cause the disease may be obviated. Prevention is better than cure, and this fact is emphasized throughout the volume. Equal care has been observed in describing and giving symptoms, so that the reader may, with as unerring certainty as possible, know the nature of the disease, and hence, what to do—and when to call for professional treatment. When the services of a skilled veterinary surgeon are required it has been imperatively advised, and care has been taken to distinguish between popular treatment and that requiring scientific and skillful management. In prescribing remedies the effort has been to give those within the reach of the farmer—such as he can procure, prepare, and easily administer.

In like manner unfamiliar words and technical phrases have been avoided as far as possible, consistent with scientific accuracy of statement. Clearness and conciseness of expression have been carefully consulted, and, to further conduce to a correct understanding, elaborate glossaries

are appended explanatory of the meaning of words in the book not familiar to everyday life.

We have reached a period of progressive farming—a period of the application of the best and most approved methods with the view to the largest and most profitable results. It is a period of sharp competition when every industry to be successful must be directed with the detailed knowledge of facts and conditions that determine success or failure. In the general material progress, live stock interest has more than kept pace. It has widened in scope and method and extended in its markets till it has compassed the earth. In its highest development it is demanding the application of scientific and practical up-to-date information. At no period in history has the farmer and his product occupied positions so commanding. The political economists have discovered the importance and the dignity of the farmer's position as the producer of the world's wealth as contrasted with the mere trafficker in what the farm produces. In that product live stock stands as one prime essential, in all pervading extent, in quick conversion to money, in vast volume and in profit. In the evolution of quality its progress has been marvelous. In the caretaking and in improved breeding is this progress and profit largely due.

But it is a fact that in this book-making age there is no well authenticated, systematic, up-to-date work in compact, convenient form accessible to the farmer in which the known facts and principles of the art of improving and breeding domestic animals, and of the causes, symptoms, prevention and cure of diseases, are presented for popular study and easy reference. Yet, such is the fact, notwithstanding the paramount importance of live stock to the farmer, and the wonderful progress that has been made in its improvement. The present effort is to supply this want. The importance of the subject cannot well be overestimated. When we consult statistics giving the millions of dollars invested in live stock in this great country, when we consider that the bulk of this immense value is distributed among those of minor wealth, as the farmer and small stock owner, who have inadequate access to educated veterinary practitioners, and who are not fully informed as to the practical principles applicable to the most successful and profitable breeding, training and general care of domestic animals, its importance is most apparent. Long experience and observation lead to the belief that a carefully arranged and classified work giving the facts in the art of breeding and general care of live stock, de-

rived from the experience of the practical and most successful stock men, will be of incalculable benefit to every owner of domestic animals.

In the following pages the value of kind treatment has been urged with marked frequency, and the fact is mentioned with no apologetic intent. It is urged as a policy both humane and profitable. What can be done to improve the condition and advance the comfort of these true friends of humanity is in the interest of economy. There is a much needed reform in the breeding, care and treatment of domestic animals, and the endeavor is here made to direct the way and point out its advantages.

In treating of the various breeds of live stock, it has been the purpose to give the special characteristics, with the excellencies and defects in each, so that the reader may know exactly which will serve best his profitable success. In this, partiality for any one breed has been avoided and an honest effort made to point out the adaptability of each to special purposes. This much needed information will enable the reader to select for special objects with unerring judgment. There has been an undeviating purpose to avoid the too common custom of advocating the claims of any one breed or class of breeders, at the expense of another, or in contradiction to correct statement. The methods of advertising specialties, too common in such books, have been scrupulously avoided.

To judge accurately the value of a horse, cow, or other animal of the farm, as also its particular features of excellence, from general appearance, manner and physical form, has been given special attention. This is susceptible to almost exact knowledge. Intelligent study of the facts here given ought to enable any one to determine the characteristics of a horse, or cow, or other animal, and whether it is best adapted to the purpose for which it is wanted. Not only can the matter of physical constitution and adaptability to a specific purpose be determined, but it is also within the power of the intelligent observer to detect vicious habits, disease and unsoundness by the same analytic observation. A special feature of this work has been to give this information in such clear, specific and analytic form, both by written word and illustration, as to make any intelligent reader a good judge of the value and qualifications, so to speak, of any horse, cow, or other domestic animal.

The age of an animal has an important bearing in estimating both value and use. To cover this point of vital interest we have, in the Horse

and Cattle department, introduced illustrated Charts giving the formation of the teeth at the various ages, accompanied by such explanation and instruction as will enable any one, by a little study and observation, to ascertain with almost perfect accuracy the ages of these animals at any period. The great value of this knowledge is readily seen and cannot well be overestimated. With this information, and the ability to understand special characteristics and defects, instruction in which is herein given and illustrated in such careful detail, the arts of the joctey will be effectually provided against.

The subject of training has received elaborate consideration, and as the value of an animal depends greatly on the care and success with which it has been trained, it is believed that the attention given to it will be productive of valuable results.

In this, as in other departments, gentle and humane methods are advocated as the most satisfactory as well as the most profitable. Allied to this, the directions and facts given concerning proper shelter, convenience and economy in building, are deemed of interest and value.

In the attainment of clearness, the generous and prodigal liberality of the Publishers in illustrating, by accurate, well executed and striking engravings, every department and chapter of the work, deserves special attention. As aiding and strengthening the enforcement of fact, this feature, made at enormous outlay, is of a practical value impossible to exaggerate.

In conclusion, the hope is indulged that the farmer and stock raiser who will attentively read these pages, and reduce to practice the suggestions here given, will find such increase of success, profit and pleasure in his noble calling as to justify his good opinion and the endorsement of this volume. If so, the author's purpose in writing it will have been accomplished.

CHICAGO, ILL.



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BOOK I

PART I

THE HORSE

HISTORY, MANAGEMENT AND CHARACTERISTICS
OF THE VARIOUS BREEDS



COACH HORSE.—FIRST PRIZE WINNER TORONTO HORSE SHOW.

THE HORSE.

CHAPTER I.

HIS ANCIENT AND MODERN HISTORY.

CONNECTED WITH MAN FROM THE EARLIEST HISTORICAL PERIOD.—I. THE HORSE IN ANCIENT HISTORY.—II. THE HORSE IN CIVILIZATION.—III. PRESERVING BREEDS IN PURITY.—IV. THE WILD HORSES OF TO-DAY.—V. FOSSIL HORSES.—VI. HORSES OF ASIA.—VII. EUROPEAN HORSES.—VIII. ARTIFICIAL BREEDING AND DISEASES.—IX. OPINIONS RELATING TO BREEDING.—X. IN-BREEDING OF HORSES.—XI. VALUE OF HEREDITARY CHARACTERISTICS.—XII. A CAREFUL STUDY NECESSARY.—XIII. ABOUT OBJECT LESSONS.

The period when the horse was first subjected to the use of man extends so far back beyond the origin of written history, that no mention is made by writers of the native country of this noble animal. That his native territory was the hill and plain regions of tropical or sub-tropical Asia, there is, however, little doubt, since it is in such regions, the world over, that this animal, upon regaining his freedom and becoming semi-wild, soonest multiplies into vast herds.

In none of the most ancient inscriptions is the horse found represented in a wild state, but always in connection with man. The fabulous stories of the centaur, a creature half human and half horse, arose from the imagination of those savage tribes who were conquered by more enterprising and partly civilized foes, who had acquired the art of subjecting the horse to use. It is stated that a Thessalian tribe, the Lapithæ, first subjected the horse, and hence acquired the name. But the horse was known in a civilization far anterior to that of this Thessalian tribe, though no record is made of the horse in a wild state even by his earliest masters. Hence we infer that the horse was not a native of Egypt, but was introduced from some other country into the civilization of that land, the earliest on record except that of China.

I. The Horse in Ancient History.

The first record made of the horse in sacred writings, is in the time of Joseph in Egypt, at which period the horse had been subjected to harness. At the time of the Exodus under Moses, the horse was extensively used in war. The Grecian mythological stories give accounts of the use of horses in war, particularly at the siege of Troy, but they seem to have been confined only to the use of heroes.

Coming down to the true historical period, we begin to find the use of horses quite universal, for pleasure as well as for war; and as civilization began to colonize the earth, the horse closely followed. Where the original

country of the horse really was matters little, except as an interesting fact, whether in Asia, or on the soil of Africa, to which his near relations, the Zebra and Quagga, are certainly indigenous. It is certain, however, that in Media and Persia, and the fertile plains of Thessaly and Thrace, on the great meadows of the Danube, in the Ukraine, on the banks of the Dnieper and the Don, and other of the great grazing grounds of Europe and Asia, the horse found congenial soil and early became semi-wild. So, after the conquest of America, transplanted here, he became semi-wild, and soon occupied vast tracts on both sides of the tropics, in countless herds.

II. The Horse in Civilization.

In extending civilization the horse has always occupied a place next to man, carrying him quickly and safely on long journeys, aiding him to explore new regions, or bearing him beyond the reach of savage foes. In the earlier stages of civilization, oxen tilled the fields, while sheep furnished clothing and food, until latterly the labors of tillage have been almost entirely transferred to the quicker and more intelligent horse. Among the nations which flourished between ancient and modern times, the Arabs seem to have regarded the horse with the greatest esteem and kindliness. Among no people were more care and attention bestowed in his breeding, and nowhere else was the horse so made the companion of man. Hence in no other country, from the seventh to the seventeenth century after Christ were horses found combining such high intelligence, with great speed and lasting endurance in travel. The Arabs were thus enabled to furnish the infusion of blood that has resulted in the English and American thoroughbred, that has stamped its measure of value upon nearly all the more highly prized of the modern sub-families of horses. Yet neither the English horse, nor the American horse, nor indeed the so-called wild horses of America, retain any characteristic of an aboriginal breed. They are, all of them, purely artificial in their breeding, or the descendants of horses artificially bred.

III. Preserving Breeds in Purity.

As among the Arabs, so among all the civilized nations of the earth, the great care is to preserve breeds in their purity. Hence pedigrees were established, first among the Arabs, and later for the English thoroughbred, while within the last thirty years stud-books are becoming common for the various valuable breeds of horses that have originated from time to time. Breeders are also beginning to understand the value of kind and careful treatment, as well as of careful training, in their influence upon hereditary traits. These things seem to be far better appreciated in America than in England. To the early and careful handling

of colts in this country, making them companion-servants, rather than machine-slaves, subjecting them to the rule of kindness, rather than the law of brute force, in short to training rather than to breaking, is due the docility of American horses, in contrast to the temper and stubborn acquiescence of English horses; and this we believe is coming more and more to be generally acknowledged.

IV. The Wild Horses of To-day.

Of the so-called wild horses of the various countries of the earth, we have the authority of Mungo Park for the fact that wild horses exist in great herds, in the country of Sudamar, far to the southward of the great desert of Sahara, and in all that district extending to Nubia and Upper Abyssinia, where there are fertile, well-watered, grassy plains, and partially wooded countries.

In northern Asia, and especially in southern Siberia, vast droves of wild horses are known to exist; and in all that great pasturable region inhabited by the Tartars, both in Russian Europe and Asia there are countless herds semi-wild. These Tartar horses are said to owe their origin to the cavalry steeds turned loose in 1657, at the siege of Azof. In Canada, and in the Falkland Islands horses released from control become wild and sustain themselves in that condition. It is stated that horses released from the dominion of Man, and gone wild, have been found in Hayti and Jamaica. The great pampas and other grassy plains of Central America, North and South of the equator, including the Empire of Brazil, and also in Mexico, Texas, California, and elsewhere in the southern portion of the great plains of the United States, once contained immense droves of wild horses, the progenitors of which, escaping from the Spanish conquerors of these countries, at length multiplied into countless numbers. At the present day however there are but few that are not claimed by proprietors except perhaps in some isolated regions near the Equator.

V. Fossil Horses.

The fossil remains of horses are not rare in America. These fossil remains, have also been found in Great Britain, in the oldest formation, and of such extreme antiquity as to have been contemporaneous with the elephant, rhinoceros, tiger and hyena, in Great Britain, and with the mammoth and other similar fossils in America. These classes of animals were entirely different from the animals of to-day, and the only means of marking the lapse of ages intervening since they lived, is the succession of geological formations, and changes that have since taken place, carrying to total extinction the series of animals that then, and subsequently, up to the advent of man, successively occupied the earth.

VI. Horses of Asia.

Aside from the modern breeds of Europe which will be treated of separately, the Arabian is the most celebrated and undoubtedly combines more good qualities than any other Asiatic breed.

In India there are many horses of more or less repute, the most valuable of which is said to be the Turco, a cross between the Turcoman, a breed of South Tartary, and the Persian horse. It seems to be a fine animal, as it is said to be stately in movement as it is beautiful in form, and tractable in disposition. With the exception of the Turcoman, or horse of South Tartary, the Tartar and Calmuck horses are small, and ill shaped. They have the reputation, like our Indian ponies, of being able to perform long journeys under heavy burdens, while subsisting on the most indifferent food.

The horses of China are also small with but little excellence in any point. Ill shaped and spiritless, they seem effete like their masters, who possessing the most ancient civilization of the earth, were slowly but surely retrograding, until they came into contact with the civilization of Europe.

In Turkestan there appear to be two distinct races of horses. One is described as being heavy-headed, ewe-necked, with long legs and weak bodies; while the other has high crests and long bodies with limbs of good bone and substance. In Bokhara, is a small, stout, shaggy breed of horses, with very long manes and tails; they are called Kussaks, and are considered excellent little animals.

VII. European Horses.

In the chapters devoted to special breeds, the more important will be treated of separately. We shall only notice here such as have no prominence among the celebrated sub-families of the horse.

The German States have horses noted chiefly as being large, well-formed and well-adapted to the purposes of heavy draft. Belgium and Holland also have breeds of horses large, strong and well-formed. The Flemish horses were at one time much valued in England for draft and heavy coach horses, and they undoubtedly form one of the principal elements in the pedigree of some of the more celebrated of the English horses.

The Hungarian horses are supposed to have the same general origin with the German horses. They are, however, lighter, more active, show more spirit and better action, which is probably due to a more recent infusion of oriental blood.

Italy has not as good horses now as formerly. Some of them however, are large, handsome, spirited animals, which do good service in carriage



IMPORTED GERMAN COACH STALLION.
Specially photographed for this work.

harness. The same may be said of the horses of Spain. The common use of mules, both under the saddle and in harness, is not conducive to careful breeding in horses, still in Spain there are many fine horses especially for saddle use; the pure blooded Spanish barb being elegant, sprightly and docile.

Norway, Sweden and Finland, have a hardy race of little horses, which run half wild in the woods. They have fairly good forms, and are active and spirited. The people, however, give themselves but little trouble in breeding them.

In Iceland the horses are still smaller, active, hardy fellows, who pick up a scanty living for themselves, when not at work. Their origin is attributed both to the Swedish horse and those of the Shetland Islands, and they have points of resemblance to both.

Thus it is seen that each country has its own peculiar breed of horses, the result of local peculiarities. The further we go North the more dwarfed they become until some of them are found but little, if any, larger than the best of the larger breeds of long woolled sheep. As we go South to the tropics the horses increase in size until we reach the middle region of the temperate zone, where the largest and heaviest, as well as the fleetest and most valuable are found. Continuing still further southward the horses begin again gradually to decrease in size until as we reach the tropics we find them but little larger than the animals we call pony-horses. They are moderately swift, and of the most enduring bottom.

The horses of Arabia have been celebrated in all modern times, and justly so, for the reason that owing to careful breeding and the kindest treatment, in connection with the most excellent training, they came to possess the perfection of form, united with great speed and endurance, and almost human intelligence. That careful and scientific breeding was understood and appreciated by the ancients is evidenced by the lines of the first lyric poet of the time of Augustus Cæsar, which we find translated freely, but pointedly as follows:

“The brave begotten are by the brave and good.
There is in steers, there is in horses’ blood
The virtue of their sires. No timid dove
Springs from the coupled eagle’s furious blood.”

VIII. Artificial Breeding, and Diseases.

It is well known that wild animals like savage tribes are little subject to disease. It is the artificial surroundings, and artificial living which produce diseases unknown in a state of nature. Hence, on the farm, animals are less susceptible to disease than in city stables, where the life of the horse is purely an artificial one, and where he must be dependent



IMPORTED COACH HORSES.

Specially photographed for this work.

upon man, even for the water he drinks. Unfortunately he is too often dependent upon ignorant and brutal "helpers" who, the moment the eye of the master is turned, shirk their duty and the animal suffers. Hence the absolute necessity that all large stables should possess in the person of the foreman a competent head, and one whose sympathies are with the helpless animals under his charge. Such a person will not only earn his wages fully, but will save largely to the owner every year by his constant watchfulness and care. Artificial breeding also gives rise to a number of diseases, peculiar in themselves, and which may only be guarded against by intelligent care. Among the most serious of these are abortion, and all that class of diseases incident to animals kept in confinement in large numbers, and which, with other diseases of domestic animals, will be treated of separately in appropriate departments of this work.

IX. Opinions Relating to Breeding.

In tracing the history of horses, and all that relates to their care and treatment, we shall find various opinions relating to breeding. The systems of in-and-in-breeding, and cross-breeding, each have intelligent and successful advocates. In-and-in-breeding may be defined as being the breeding together for generations, of closely related members of a family of animals. For fixing a breed and for perpetuating the special excellences sought, there is no doubt of the soundness of the practice. It is in this way and by careful selection of parents that all new breeds are established and fixed. What distinguishes the successful from the unsuccessful breeder, is the knowing, or not knowing, just how to select, how long to breed in, and in departing from the rule, so to select the new sire, that there may be no violent change of characteristics. For it is a well established fact that long-continued in-breeding reduces the constitutional vigor of the animal while it is fixing excellencies for perpetuation. Bakewell, Collins, Bates, Webb, and many other eminent breeders of modern times, have been most successful in this direction, with cattle and sheep. The modern breeds of swine, also, owe their chief excellencies to this system, though in them it is modified by more frequent infusions of far related blood, since swine are peculiarly liable to degeneration of the vital forces, scrofula, and other diseases, supposed to be due to too close inter-breeding of near relations.

X. In-Breeding of Horses.

In horses, in-and-in-breeding has never been practiced to the same extent as with cattle. The horse is bred chiefly for his muscular powers and endurance. To this is required to be added, beauty of form, and as supplementary to speed and endurance, great lung power and constitutional vigor. Hence, when a sire possesses these merits in an eminent



PRIZE WINNING COACH HORSES.
Specially photographed for this work.

degree, he is eagerly sought far and wide. In the selection of mares, this vigor of constitution, combined with ample room for the development of the foal is sought. Hence the breeder seeks to breed to such sires as shall endow their foals with their own special characteristics, being careful only that the cross shall not be a violent one, such as might produce decided alterations of form from that previously had.

XI. Value of Hereditary Characteristics.

Intelligence, stamina, great muscular power, constitutional vigor, and absence of congenital or hereditary disability, must all be taken into account in selecting sires. If the blood of an animal has been subject to any hereditary disability, as consumption or other disease arising from weak lungs, or has shown a liability to form curbs, spavin or other bone disease, such an animal should be discarded. Intelligence is a hereditary characteristic of special families which should be carefully looked to. Here again we find that this quality may be steadily increased by careful training. This is especially noticeable in dogs bred for a single purpose, as shepherd dogs, pointers, setters, retrievers, etc. The hereditary instinct becomes at length so strongly marked in them, that the young animal takes to its special task of its own volition, and before the age for regular training is reached. In like manner certain breeds of horses are noted for their wonderful intelligence, as are the Arab horses, owing to hundreds of years of careful breeding, and to the training imparted by the master, who is the friend and companion of his horse.

XII. A Careful Study Necessary.

To most surely and successfully compass all this, the breeder must carefully study the horse from various standpoints. He must be familiar with the anatomy, or bony structure, the muscular development, the vital organs, the organs of digestion, and the other viscera of the animal. Again, the outward conformation is of the utmost importance, since from this a fair indication of all the rest may be arrived at. The girth and the barrel will give a good indication of the heart, lungs and digestive apparatus. From the head, the intelligence and docility of the animal may be clearly established. The shoulders, the loin and the haunch will be the index to the muscular power, and the bone and sinew may be accurately estimated from a proper examination of the limbs by one who will carefully study the succeeding chapters.

XIII. About Object Lessons.

Object lessons, the delineation of a subject by charts, plates and figures, have come to be regarded as one of the most important factors in modern education. They bring to the eye exactly what a thing is, and

its precise location. Hence, there has been prepared for this work the most accurate illustrations of every subject upon which it treats. In connection with this, the plainest descriptions and explanations are given, avoiding, as much as possible, technical scientific terms. These, when used, are explained, so far as possible, and should be learned by reference to the glossary since now-a-days, they are coming to be more and more used in every-day life, and in all languages, where used, mean exactly one and the same thing.



CHAMPION GAITED SADDLE STALLION, HIGHLAND CHIEF.

If the latter part of this chapter has been somewhat discursive, it seemed necessary to a fair understanding of what is to be said in the succeeding ones. In the next chapter we take up the horse in the relation of the bones to the body. Its scientific name is Anatomy—short enough and comprehensive.



ONE AND TWO-YEAR-OLD HERD MORGAN COLTS.
Specially photographed for this work.



HACKNEY STALLION "SQUIRE RICKEL."—FIRST PRIZE WINNER AND SWEEPSTAKE WINNER TORONTO HORSE SHOW.

CHAPTER II.

ILLUSTRATING THE ANATOMY OF THE HORSE.

I. FRAME WORK THE INDEX OF VALUE.—II. MASTER THE DETAILS OF THE SKELETON.—III. DIVISION OF THE SEVERAL PARTS.—IV. COMPARATIVE ANATOMY OF MAN AND THE HORSE.—V. ANALYZING THE SKELETON.—VI. THE FOOT.—VII. THE HEAD AND NECK.—VIII. BONES AND MUSCLES OF THE FRONT LIMBS.—IX. THE HIND LIMBS.

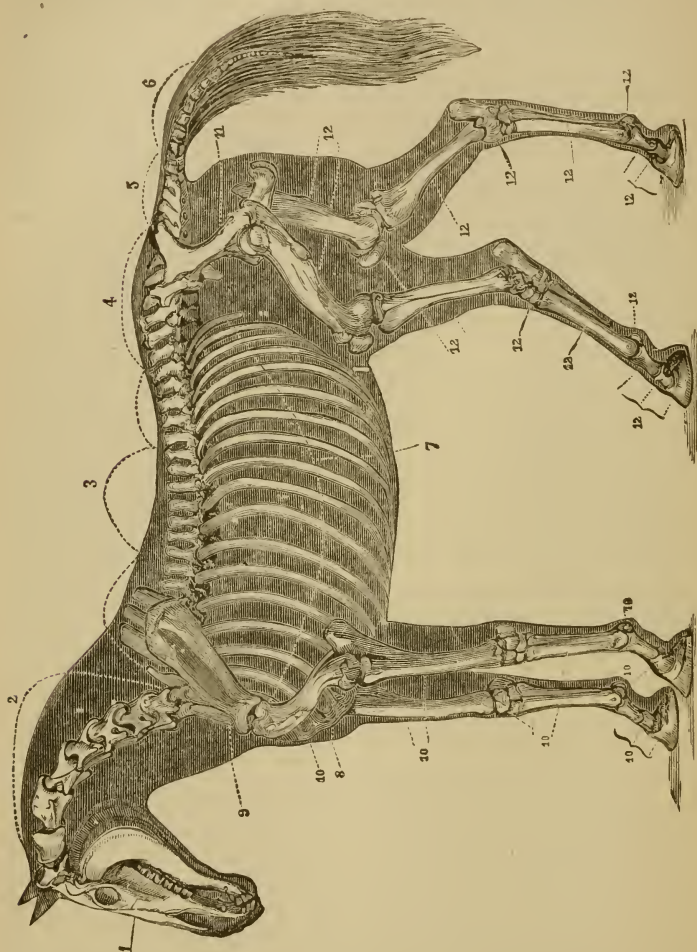
I. Frame Work the Index of Value.

A close and comprehensive study of the anatomy and physiology of the animals of the farm, is of the first importance to every person who breeds, rears, or buys them, with a view to profit from their sale. In the case of the horse it is especially necessary that this study be carefully made, since, in the perfection of the several parts, constituting solidity and fineness of bone, a firm and complete muscular development, large, healthy lungs, and the highest state of normal activity of the digestive organs, lies the real value of this most useful of the servants of man. The owner or purchaser must also know distinctly what an animal is intended for, and should select him with special reference to the service required, whether it be for special work, for trotting, racing, road-driving, light or heavy draft, or for what is termed general utility. With reference to these several uses the bony structure of the animal is of the first importance, since it is the skeleton upon which all else is built. Without a knowledge of the bones, the situation of the muscles cannot be accurately determined, or their actions, in connection with the several parts, to which they are attached, and especially their action on the limbs be definitely understood.

II. Master the Details of the Skeleton.

Hence we must first master the details of the bony structure. Next the muscles may be studied, and from this we may easily understand the minute but important action of the several parts as a whole. While the ordinary observer will be altogether misled, in estimating the value of an animal from his outward appearance and movements, he who has carefully studied the physical proportions with the eye of a careful anatomist will quickly and accurately understand the true value of the animal from the relation of the several parts one with another. For these habits of accurate observation will readily detect, in the living horse, the true character of the bony structure, and especially of the muscular system, which covers and envelops it. In order to make the bony structure plain to the reader it is here shown by

diagrams or object lessons, since this is the most graphic, and at the same time the most accurate, method of presenting information of this kind. To make our object lesson still more easy we give



CUT 1.—SKELETON SHOWN AGAINST OUTLINE OF LIVING HORSE.

in the engraving, not only the frame-work, but this resting on or shown against a back ground illustrating the outer form and contour of the horse.

The skeleton, as shown in the engraving, may be divided as follows: 1—Cranium, or Head. 2—Cervical vertebræ, or bones of the neck. 3—Dorsal vertebræ, or bones of the withers and back. 4—Lumbar vertebræ, or those of the loin between the false ribs and the upper edge of the Haunch Bone. 5—Sacral vertebræ, or those of the rump, or lying between the haunch bone and tail. 6—Caudal vertebræ, or bones of the tail. An observation of the dotted lines will show these correctly. 7—The Ribs, showing their correct position. 8—Sternum, or the breast bone. 9—Scapula, or shoulder bone. 10—The front limbs. 11—The Pelvis, the cavity of the body formed by the union of the haunch bones with those of the back and hip, and formed by the Sacrum at the top, the Ilium at the sides, the Ischium and the Pubis at the bottom. 12—The hind limbs.

III. Divisions of the Several Parts.

Thus we have given the entire skeleton of the horse, showing the bones as they appear in their natural positions and relations to each other. We next proceed to a more detailed study of the several parts.

The Head and Back Bones.—The head may be divided into two parts, the skull and the face, each having its particular bones, the variation of which may affect the proper grinding of the food and thereby influence the general condition of the animal, to say nothing of the relation between the shape of these bones and the horse's intelligence. The vertebræ are divided into five groups, of which the Cervical or neck, contains seven bones; the back, or Dorsal, eighteen; and the Lumbar, six. The Lumbar vertebræ really belong to the back, and added to the eighteen Dorsals, make a total of twenty-four. The Sacral vertebræ are five in number, and the Caudal fifteen, making a grand total of fifty-one vertebræ in the animal.

The Ribs.—The ribs are eighteen in number and are jointed to the transverse processes of the vertebræ, and curve, with some variations in their outline and direction, down to the sternum. Seven or eight of them are true ribs, and are composed of cartilage and attached to the breast bone and to the vertebræ, to allow full expansion of the lungs in breathing. Thus the spring of the ribs, as it is called, is most important to the horseman. The remaining ribs are called false ribs. They are not attached to the breast bone, but are united by cartilages, each on its own side, the union terminating in the sternum. Thus, all the ribs act in concert, giving play not only to the lungs, but also to other viscera.

The Sternum.—The Sternum, or breast bone, in the young horse, is composed of six bones, but in the full grown animal these become united into a single piece. The front of this bone is convex and sharply

keeled and its upper part projects so as to be plainly outlined in what is called the point of the breast, that part which the lower portion of the collar just covers.

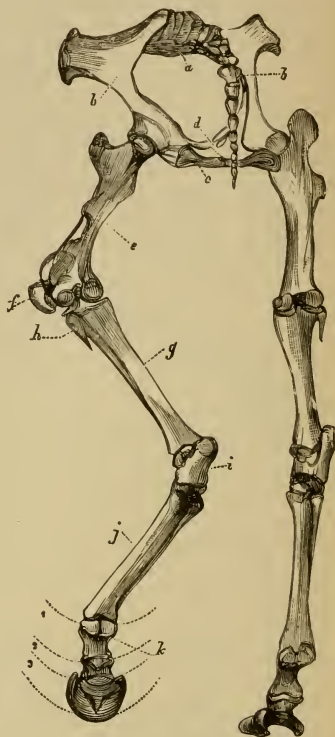
The Hinder Limbs.—The Hinder Limbs are the propelling power of all animals, and especially so in the horse. Hence the haunches are strong and the upper portion is powerfully developed in muscle, and the lower correspondingly so in tendons. The illustration will give a perfect view, and the explanation the proper names of the parts.

The names and reference to the letters and figures are as follows: a, Sacrum; b, Ilium; c, Ischium. These bones constitute the Pelvis, as seen at a, d, c, and b, b. The other bones are: e, Femur; f, Patella; g, Tibia; h, Fibula; i, Tarsus; j, Metatarsus; k, Digit. The figures 1, 2, 3, refer to the Phalanges of the foot, corresponding to the toes in man.

The Haunch or Pelvis.—The Pelvis is made up of six bones, three on each side, all firmly united into one. The Ilium is strongly attached to the Sacral vertebræ, and may be called the keystone of the pelvic arch, while the lateral prolongations of the Ilium produce the prominences just above and in front of the hind-quarters. The Ischium or hip-bone is a backward continuation of the Ilium, and bears an enlargement which projects on each side a little below the tail. The pubis is a single bone and is connected with the others, forming an inverted arch with them, and composing the upper surface of the lower part of the pelvis.

IV. Comparative Anatomy of Man and the Horse.

The anatomy or bony structure of the horse is not so widely different from that of man as at first sight it would seem to be. Indeed, it was discovered by Aristotle in the days of the ancient Greeks that the horse, though a hoofed, and apparently a single-toed animal, actually has the



CUT 2.—BONES OF HINDER PARTS.

rudiments of toes enveloped in the flinty hoof which has developed around the foot and protects it from the rough soil over which the animal travels. And when a parallel is once found to exist even between the toes of the horse and those of man, there is nothing strange in the fact that other parts of the skeleton closely correspond. The names of the different portions of the limbs of the horse and of man are given below, in parallel lines, so the reader may see at a glance, those exactly corresponding, though called by different names. A reference to the skeleton proper, as given in the cut, page 54, will show the precise location of each of the bones mentioned in the horse.

Front Limbs.

MAN.			HORSE.
Arm (Humerus) corresponds to the	-	-	Lower bone of shoulder.
Fore arm	"	"	Arm.
Wrist (Carpus)	"	"	Knee.
Hand (Metacarpus)	"	"	Leg, cannon and splint bones.
Knuckles	"	"	Fetlock.
Finger	"	"	Pasterns.

Hind Limbs.

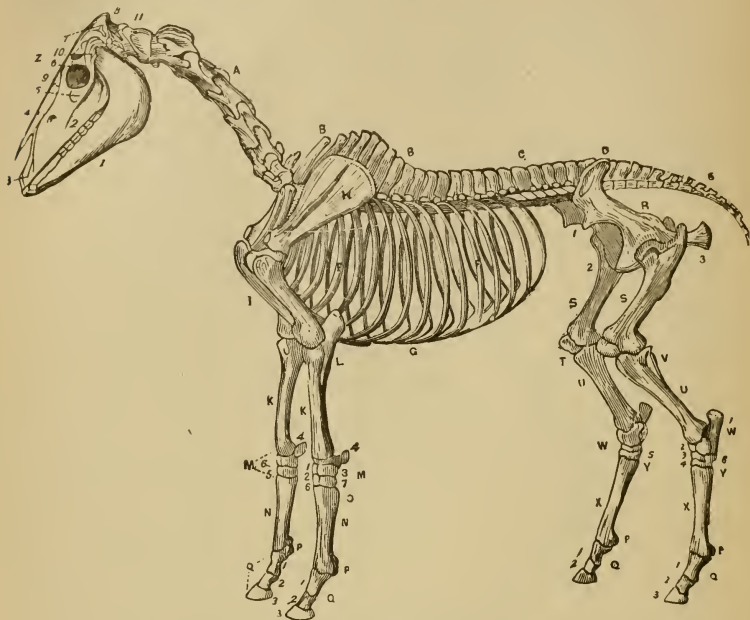
MAN.			HORSE.
Thigh (Femur) corresponds to the	-	-	Upper bone of thigh.
Knee	"	"	Stifle joint.
Leg	"	"	Thigh.
Ankle (Tarsus)	"	"	Hock.
Heel	"	"	Point of hock.
Foot (Metatarsus)	"	"	Leg.
Ball of Foot	"	"	Fetlock.
Toe	"	"	Pastern and foot.

This is quite different from the generally received idea of the comparative anatomy of man and the horse, and yet it is strictly true. This the skeleton will show, the proper names of each bone being given. The study is interesting, and the explanations will enable any one to fully understand the names and location of the parts.

V. Analyzing the Skeleton.

The bones of the spine, (vertebræ) have already been mentioned. The parts of the skeleton as shown in the next figure, are: A, Cervical Vertebrae; BB, Dorsal Vertebrae; C, Lumbar Vertebrae; D, Sacrum, the bone which forms the back part of the pelvis; E, Coccygeal bones, or those forming the tail; FF, Ribs; G, Costal cartilages, or the cartilages joining the ends of the ribs; H, the Scapula or shoulder blade; I, the Humerus, or the upper part of the fore leg; KK, the Radii, or outer bones of the fore legs, below the humerus and knee; L, the Ulna. This is the larger of the two bones of the upper part of the fore leg, lying behind the radius and extending from the knee to the lower part of the chest; M, the Knee, (Carpus). This is composed of 8 bones, viz:

1, Scaphoid, or boat shaped bone ; 2, Semilunar, or bone resembling a half moon ; 3, the Cuneiform, or wedge-shaped bone ; 4, the Trapezium, resembling the geometrical figure of that name ; 5, the Trapezoid, re-



CUT 3.—THE SKELETON.

sembling a trapezoid ; 6, the great bone of the knee, (Os Magnum) ; 7, the Hook-shaped bone, (Unciform bone) ; 8, the pea-shaped bone, (pisiform bone) ; NN, the big bone of the fore leg, the cannon bone or large metacarpal ; O, Splint bone, or small metacarpal ; PP, Sessamoid bones—two small bones in the substance of the tendons, where the fore leg is joined to the ankle ; QQ, Phalanges. These are : 1, the upper pastern bone ; 2, lower pastern bone ; 3, the first bone in the leg, (os pedis), inside the hoof, the coffin bone, and the navicular or ship-shaped bone, not marked here.

The Hinder Parts.—Coming to the hinder parts, R shows the pelvis. This is formed by : 1, the Ilium or flank bone ; 2, the Pubis, or fore part of one of the bones of the pelvis ; 3, the Ischium, or hinder and lower part of the hip bone. S, the Femur or thigh bone ; T, the Patella or small bone covering the stifle joint ; U, the Tibia or the large, long bone between the hock and the stifle joint ; V, the small, long bone behind

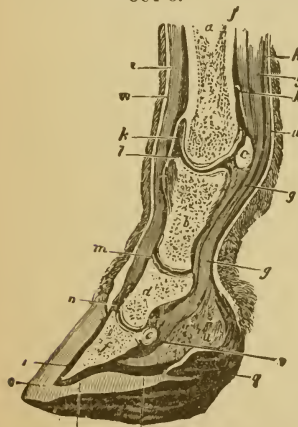
and attached to the Tibia; W, the Hock, which is composed of the following small bones: 1, back point of the hock, Os Calcis; 2, the Astragalus or upper bone of the hock, supporting the Tibia; 3, Cuneiform Magnum, the largest wedge-shaped bone; 4, Cuneiform Medium, or middle-sized wedge-shaped bone; 5, Cuneiform Parvum, or smallest wedge-shaped bone; 6, the small or cubical-formed bone. X, Large Metatarsal or front bone of the hind leg, between the hock and pastern joint; I, Small Metatarsal or small bone of the hind leg, in rear of Large Metatarsal.

The Head.—1, the lower jaw, (Inferior Maxilla); 2, the upper jaw, (Superior Maxilla); 3, outer part of the jaw, (Anterior Maxilla); 4, bone in front of the nostrils, (Nasal bone); 5, the prominent cheek, (Malar bone); 6, the forehead, (Frontal bone); 7, Parietal bones or sides and upper part of the skull, (wall); 8, Occipital, or bone of the hinder part of the head; 9, Lachrymal bone, inclosing the lachrymal gland and duct; 10, Squamous or scaly portion of the temporal bones; 11, Petrous or hard part of the Temporal bones, inclosing the organs of hearing.

VI. The Foot.

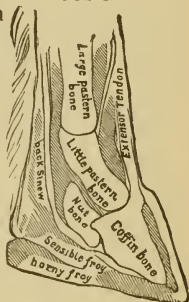
We will now enter upon a more critical examination of the foot, one of the most important parts in the anatomy of the horse. We give a cut showing the bones, as they lie, plainly named, and also a vertical

CUT 5.



VERTICAL SECTION OF THE LOWER
LEG AND FOOT.

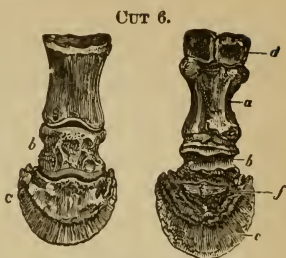
CUT 4.



SECTIONAL VIEW OF
THE BONES OF THE
FOOT.

section of the lower leg and foot. The several parts here illustrated are: *a*, cannon or large Metacarpal bone; *b*, large Pastern bone (Os Suffraginis,) *c*, one of the Sessamoid bones; *d*, Os coronæ, small pastern bone; *e*, navicular bone; *f*, Pedis or coffin bone; *g*, *g*, Flexor Perforans or penetrating tendon; *h*, *h*, Flexor Perforatus or penetrated tendon; *i*, extensor tendon; *j*, suspensory ligament; *k*, *k*, Capsular ligament or membraneous elastic bag surrounding the joint; *l*, fetlock joint; *m*, pastern joint; *n*, coffin joint; *o*, horny crust of hoof; *p*,

p, horny sole; *q*, the frog; *r*, sensible laminae; *t*, the sensible frog; *u*, the cushion; *v*, the navicular joint. The next figures show front and rear views of the bones of the foot. *c, c*, Coffin bone; *d*, Sessamoid bone; *b, b*, Small pastern *a*, The large pastern.



FRONT AND BACK VIEW OF THE BONE OF THE FOOT.

VII. The Head and Neck.

Coming again to the head and neck we are prepared readily to understand their anatomy. The names given to the several parts are as follows: *a*, frontal bone; *b*, parietal; *c*, occipital; *d*, temporal; *e*, malar; *f*, lachrymal; *g*, nasal; *h*, superior maxillary; *i*, pre-maxillary; *k*, inferior maxillaries (lower jaw); *l*, orbit. The bones of the neck, (cervical vertebræ) are named; 1, atlas; 2, dentata; 3, third; 4, fourth; 5, fifth; 6, sixth; 7, seventh. Of the bones of the neck, the atlas is a ring-shaped bone with broad lateral projections. It articulates with the skull, and has great freedom of motion on the next bone (dentata). On the articulation of these two vertebræ, principally depends the power of turning the head. The remaining bones of the neck resemble each other closely, and have various small processes for insertion of the ligaments and muscles, and upon their flexibility depends the power of flexing and arching the neck.

The Head.—The bones of the head may be divided into two groups; the cranial and facial. The cranial bones include all those which cover or inclose the brain, and are mostly in pairs, or are on what is called the mesial line of the skull, but may, for convenience, be spoken of as single bones.

The bone of the forehead (frontal bone) *a*, forms the space between the eyes and extends to the top of the head with a narrowing outline. It therefore occupies the most central part of the head and is important as from its shape and surface it gives space for the brains. In succeeding cuts the facial expression of horses will be given, showing the different grades of intelligence in horses; the broad and ample forehead indicating intelligence and high breeding.

The parietal bone, *b*, extends back from the frontal to the poll, and has a ridge or crest of great strength and firmness along its upper surface, sloping down like a roof on each side, covering and protecting the brain.

The occipital, *c*, covers the entire back part of the head and lies immediately behind the parietal. It has to support the whole weight of the head, and from its position is exposed to greater strain than any other part of the skull. It is articulated by two rounded protuberances (condyles) at the base to the first vertebra (atlas) of the neck. On the

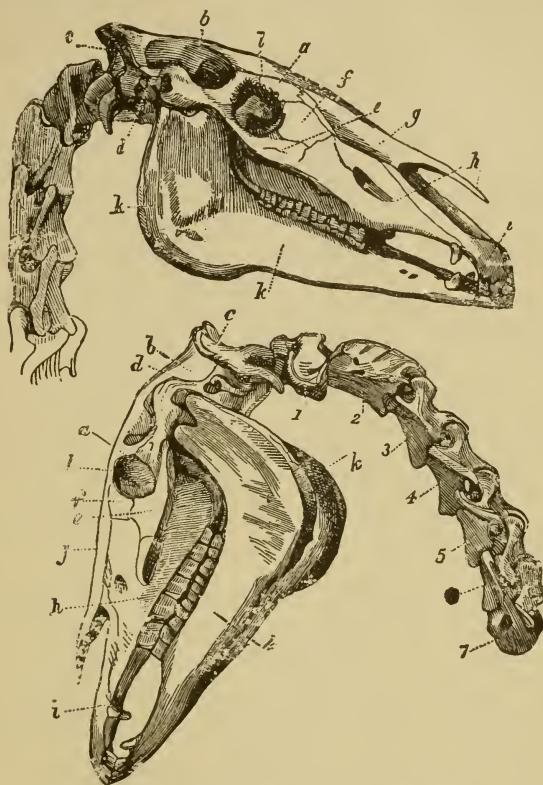


PLATE 7.—SHOWING BONES OF HEAD AND NECK.

outer side of the occipital and beyond the condyles, are two pointed projections (styloid processes) to which some of the muscles of the neck are attached, and which assist in supporting the head.

The temporal bone, *d*, unites with the parietal above, and with the occipital behind. It contains the internal parts of the ear, and is provided with a hollow for the articulation of the lower jaw, and in front joins the extremity of the frontal. Continuing forward, it unites with

the cheek-bone (malar), *e*, making up the zygomatic arch and forming the greatest part of the orbit, composed of a small bone in the inner corner of the eye (lachrymal), *f*. Just before the frontal is the nasal bone, *g*, one of the principal bones of the face and covering the membrane of the nose. The large bone, (superior maxillary), *h*, occupies the side of the face and holds all the grinding teeth (molars) and the tusk of the upper jaw. The pre-maxillary, *i*, unites with the two last named bones, holds the nippers (incisor teeth) and completes the framework of the nose. The lower jaw consists of only two bones, the inferior maxillaries, *k*. They terminate in two processes, directed upward. The terminal projection (condyloid process) articulates with the temporal bone, at the base of the zygomatic arch, forming the hinge upon which the whole lower jaw moves. The second process (coronoid) passes under the arch, receiving the lower end of the large temporal muscle arising from the parietal bone, and moves the jaw in the act of chewing.

There are two small bones in the lower part of the cranium, under the parietal, *b*, called the Sphenoid, and the Ethmoid, which connect the principal bones of the skull, but are not visible externally.

VIII. Bones and Muscles of the Front Limbs.

Coming again to the limbs, we represent in cut 8 on the next page, for the sake of comparison, both the bones and muscles of the front limbs side by side, since it will serve as a convenient object lesson at one view.

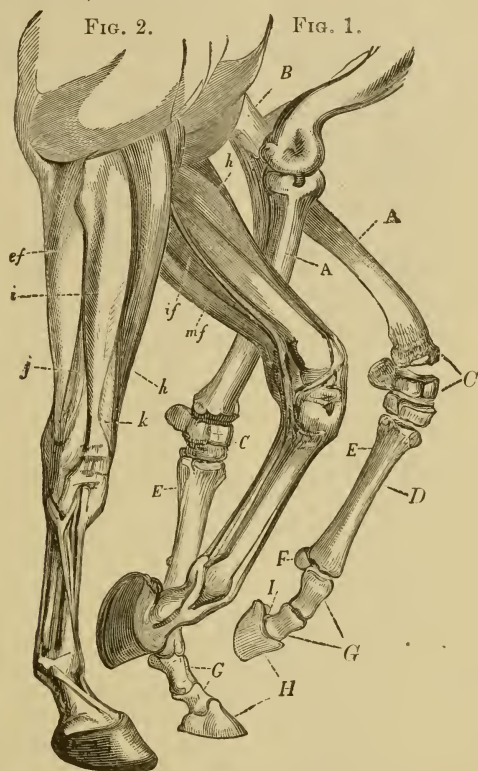
Bones.—A—Radius. B—Point of Ulna. C—Knee (Carpus). F—Semamoids, behind the fetlocks. G—Upper and Lower Pasterns. H—Coffin Bone. I—Navicular.

Muscles.—*h*—*Extensor carpi radialis*. *i*—*Extensor digitarum longior*. *j*—*Extensor digitarum brevior*. *k*—*Abductor pallicis longus*. *ef*—*External flexor*. *mf*—*Middle flexor*. *if*—*Internal flexor*.

Bones of the Arm.—The upper portion of the fore leg in the horse is called the arm, and in man the corresponding bone is the fore arm. In the horse it consists of two bones, the radius A and the ulna B, and extends from the elbow to the knee. The ulna is situated behind, and, to some extent, above the radius, there being a considerable projection received between the heads of the lower bone of the shoulder (elbow), forming a powerful lever, into which are inserted the muscles for extending the arm. The ulna continuing downwards, terminates in a point behind the middle of the radius.

Bones of the Knee.—Cut 9 on page 70 shows in detail the various bones of the knee: Fig. 1, the left leg, outer side; Fig. 2, a front view. The position and action of the knee, render it especially liable to shocks and

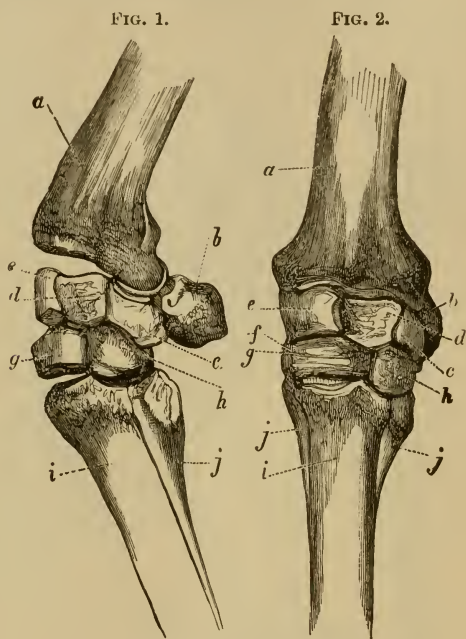
bars, or strains. Hence it is protected by being formed of a number of bones, strongly united by ligaments, each bone being protected by cartilage, and resting on a semi-fluid cushion, so that any shock may be distributed over the whole number of distinct bones. The names of the bones are as follows: *a*, Radius; *b*, Pisiform; *c*, Cuneiform; *d*, Lunare; *e*, Scaphoides; *f*, Magnum; *h*, Unciform; *i*, Cannon; *j*, Splint. These two latter are called Metacarpals.



CUT 8.—BONES AND MUSCLES OF THE FORE LEGS.

By reference to cut 9 on page 64, the arrangement and shape of the several bones will be readily understood. A large, flat knee is essential in the horse, since it not only carries plenty of integument, but allows free play to this portion of the leg. Fig. 1 shows the knee flexed and Fig. 2 the knee at rest.

The true carpal bones are seven in number. Six of these are placed in two rows, each containing three bones in front of the joint, while the seventh, the pisiform, (Trapezium), is placed behind them, forming the point of insertion for some of the muscles of the arm. It also aids in protecting the tendons running down behind the leg.



CUT 9.—SHOWING BONES OF THE KNEE.

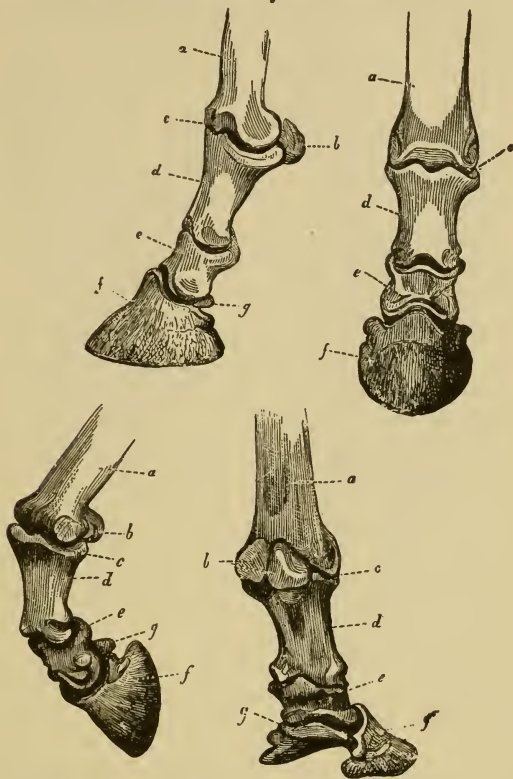
Bones of the Leg.—Between the knee and the fetlock are three bones, the shank (cannon) and two splint bones, as shown in cut 8, page 63, Fig. 1. D. These form the leg, the corresponding part in man being the metacarpus. The cannon bone articulates at its upper extremity with the lower row of the bones of the knee and below with the upper pastern of the fetlock joint. It has scarcely any muscle, those parts not covered by tendons, as well as the parts so covered being enveloped directly by the skin. The leg bone is nearly straight, rounded in front and flattened or slightly concave behind. The splint bones, slender bones attached to the cannon to strengthen it, diminish to a point before they reach



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REAR VIEW THREE-YEAR-OLD PERCHERON HORSES.
Noted Prize Winners.—Specially photographed for this work.

the fetlock joint. Behind this are two supplementary bones, called sesamoids, *b*, in cut 10, and page 65. These serve to protect the back of the joint and some important ligaments passing over it. More fully to illustrate the lower part of the front limbs, we give four figures, showing the bones and articulations of the joints of the foot.



CUT 10.—BONES AND ARTICULATIONS OF THE FOOT.

The names of these bones are as follows: *a*, cannon, or shank; *b*, sesamoids; *c*, fetlock joint; *d*, upper pastern; *e*, lower pastern; *f*, coffin bone; *g*, navicular bone. The upper and lower pasterns, *d*, *e*, have considerable motion one on the other to allow the foot to be bent back. The toe is formed by the coffin bone. This is surrounded and covered in by the horny hoof. Hence, its form is never seen unless dissected for. Another small bone, the navicular, *g*, lies behind and partly within the junction of the coffin and lower pastern. Like the coffin bone, it is inclosed by the hoof.

IX. The Hind Limbs.

The bones of the limbs terminating and inclosed within the body of the horse, as well as the whole of the front limbs have been carefully illustrated and described. Many persons suppose, if they understand something of the anatomy of one limb, that they understand them all. This is a mistake, for while there are points in common, there are many differences. Hence the necessity of illustrating every part fully in order that the reader may get a full comprehension of every part. Further on we give a cut showing the bones of the hock joint and portions of the bones above and below. In the illustration, page 56, the anatomy of the entire limb may be studied.

Anatomy of the Hind Limbs.—The great bone of the thigh (femur) which articulates with the upper bone (ilium), which in turn is joined to the back, is very strong, stout and short for its bulk. It is also further strengthened by large projections (trochanters), placed in the direction of the length, or longitudinally, for the attachment of important muscles. The upper extremity of the femur has a rounded head on the inner side, fitting into, and articulating with, a horny cup (acetabulum) formed at the junction of the three pelvic bones. At the lower end are two prominences fitting into depressions in the true bone of the thigh (the lower part of which is shown in the preceding illustration) and in front of which is placed the knee cap (patella), making what is called the stifle joint, which, anatomically, corresponds to the knee in man. The thigh bone is made up of two parts, the tibia, or bone proper and a small bone at the top (fibula), which reaches down the bone for about one-third its length. It is attached to the large bone by cartilage, and corresponds to the small bone (ulna) in the shoulder of the horse. The next illustration shows the bones of the hock. Figure 1, back view, inner side; figure 2, front view, outer side.

Bones of the Hock.—The names of the bones of the Hock (Tarsus) as shown in cut 11 are: *a*, Tibia; *b*, Os Calcis; *c*, Astragalus; *d*, Cuneoides; *e*, Naviculare; *f*, Outer Cuneiform; *h*, Splint; *i*, Cannon, (shank bone.)

The hock is as important as it is complicated. It corresponds to the ankle and heel in man, and is a prime factor in the means of progression. Like the knee of the horse, it consists of small bones, interposed between the upper bone, Tibia, and the Cannon bone below. These are six in number, as given above. The projecting bone at the back, the heel bone, (Os Calcis), is moved by tendons arising from muscles in the lower part of the limb.

One of the Main Springs.—The principal one of these is the tendo-achillis. In all fast animals it is much developed, since an increase in

the length of this lever adds force to the spring; for it must be remembered that progression is simply a succession of springs. Hence in all four-footed animals, the chief motive power lies in the hinder limbs and hence,

Fig. 1.

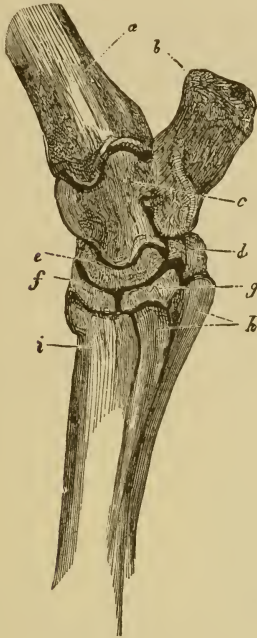
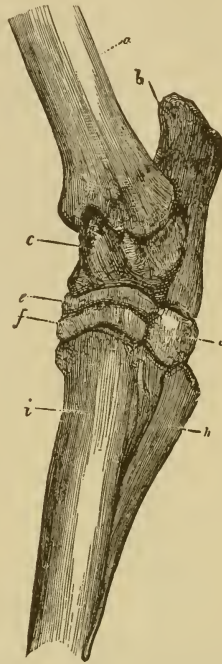


Fig. 2.



CUT 11.—BONES OF THE HOCK.

again, the reason why these are so much developed. Whether the animal be required for draft or saddle, the propelling power requires to be especially studied. The skeleton is the frame-work upon which all this is developed.

CHAPTER III.

THE MUSCULAR SYSTEM AND INTERNAL FUNCTIONS OF THE HORSE.

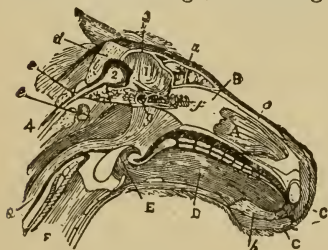
THE ECONOMY OF THE MUSCULAR COVERING.—II. MUSCLES OF THE HEAD AND NECK.—III. MUSCLES OF THE SHOULDER AND BACK.—IV. MUSCLES OF THE HINDER PARTS.—V. MUSCLES OF THE FORE LIMBS.—VI. MUSCLES OF THE LEG AND FOOT.—VII. STUDYING THE STRUCTURE.—VIII. INTERNAL ECONOMY OF THE HORSE.—IX. EXTERNAL PARTS OF THE HORSE.

I. The Economy of the Muscular Covering.

While, as already stated, the bones are the frame-work of the animal, the covering of the bones, viz: the sinews, muscles, nerves, membranes, etc., are really what constitute the motive power of the animal. With the nerves and membranes we shall have little to do; their study will not be necessary to a correct understanding of the value of a horse to the farmer, breeder, or buyer. The bony and muscular development being perfect, and the digestive apparatus, the viscera, and all that pertains thereto, being healthy, the nerves and membranes may be taken for granted as being in good order. We therefore proceed at once to a consideration of the more important organs which constitute the working parts of the horse.

This we have most carefully illustrated on the next page by a cut, showing the entire figure of the horse with the principal muscles laid bare. They need not be referred to here, since they will be named further on in considering the illustrations of the several parts. The engraving is considered necessary, as showing the connection of the parts, one with another, as the animal appears in walking.

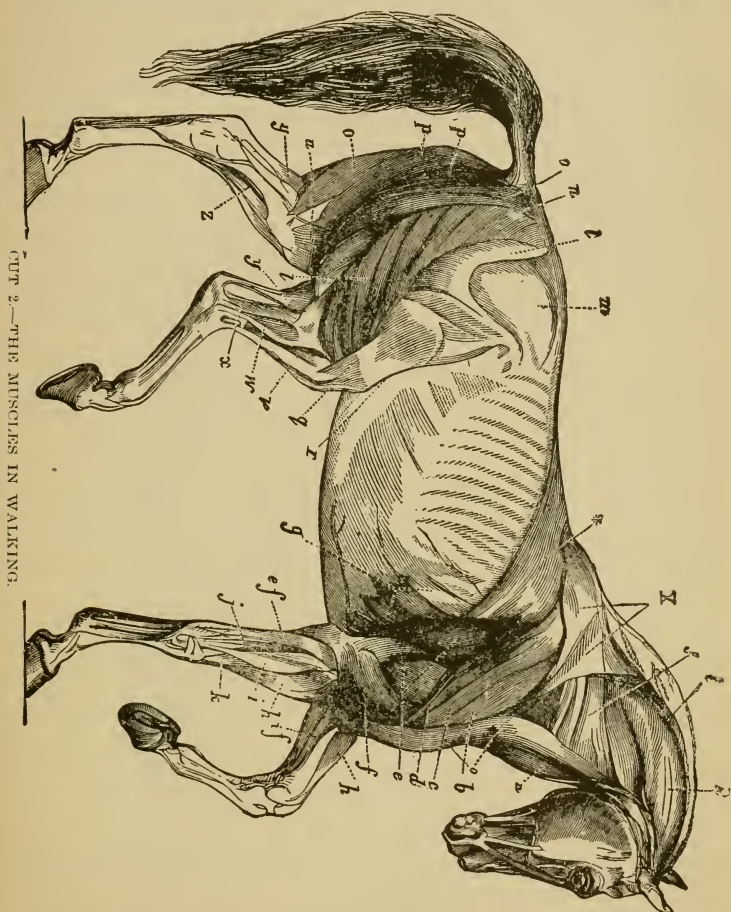
A Vertical Section of the Head.—A section of the head may here be studied to advantage, as showing not only the bony and muscular structure, but the brain and ganglia as well.



CUT 1. HORSE'S HEAD, OPEN TO VIEW.

In the study of this figure we find at *a*, the frontal bone, showing the cavity or channel, (*sinus*) beneath; *b*, the wall bone (*parietal*) covering the brain; *c*, the nose (*nasal*) bone; *d*, the bone (*occipital*) at the back of the head; *e*, *e*, the first bone of the neck, (*atlas*) showing the spinal marrow in the center; *f*, the sieve-like (*ethmoid*) bone through which the nerve, (*olfactory*) giving the sense of smell passes; *g*, the wedge-like bone, (*sphenoid*). This, with the ethmoid bone, supports the base of the brain. At *h*, between *C* and *D* is shown part of the lower, (*max-*

illary) jaw bone, with the lower nipper (*incisor*) teeth. Coming to the numerals: 1, is the large portion of the brain, (*cerebrum*); 2, the small brain (*cerebellum*); 3, the upper portion of the spinal marrow (*medulla oblongata*), where it leaves the small brain; 4, the spinal marrow itself. The capitals show, at A. the thin bony plates, (turbinated bones) in



CUT 2.—THE MUSCLES IN WALKING.

the form of a scroll, which serve to distribute the lining membrane of the nose; B, the cartilaginous division, (*septum nasi*) between the nostrils; C, C, the lips; D, the tongue; E, the valve of the larynx (*epiglottis*); F, the wind pipe, (*trachea*); G, the gullet (*aesophagus*).

Economy of the Head.—We have heretofore spoken of the bones of the head being in pairs. So also are the various organs of the body as a rule, namely: the ears, eyes, nostrils, lips, the lobes of the lungs, the valves of the heart, the kidneys, etc. Thus the two frontal bones (*a*) make up the forward part of the head. The wall bones (*b*) cover the outer lobes of the large portion of the brain. The occipital bone (*d*) is strong and solid, and at its back contains the spinal marrow, and some nerves and arteries which pass from the brain; at the point where it is jointed to the first bone of the neck it is rounded and smoothed to make the articulation perfect. The sphenoid bone (*g*) forms the inferior and central part of the skull (*cranium*). Near the bones of the face (*facial bones*), are sinuses or channels, that are named from the bones which they pierce or channel. The bones of the head are of two kinds, the soft and scaly, (*squamous*), and the hard, (*petrous*), bones. The temporal bones are likewise of both kinds; the hard portion contains the organ of hearing, and on its inside surface are openings for the passage of the auditory nerve, and on its outside larger openings for the passage of sound.

II. Muscles of the Head and Neck.

The muscles of the head are not many. Those of the mouth, nostrils, ears and neck, are the most important from the standpoint of the breeder. Cut 3 on the next page we give shows, at two views, the various muscles of the head and neck.

The Muscles of the Head.—*a*, the cheek, (*Masseter*) muscle; *b*, temporal muscle, (*temporalis*); *c*, circular muscle, (*orbicularis*), surrounding the eye; *d*, the raising muscle, (*levator*); *e*, *orbicularis oris*; *f*, the *dilatator naris lateralis*; *g*, *Zygomaticus*; *h*, *nasalis labii superioris*; *i*, *depressor labii inferioris*.

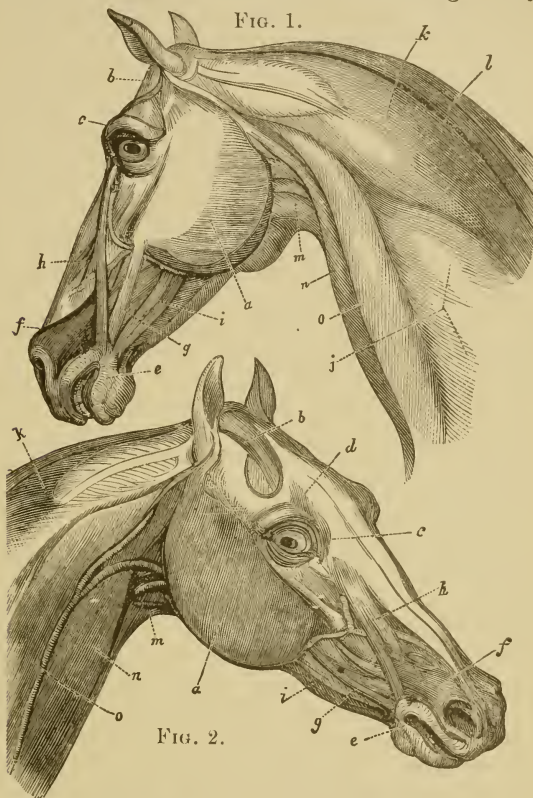
Muscles of the Neck.—*j*, *complexus major*; *k*, *splenius*; *l*, *levator anguli scapulae*; *m*, *Hyoideus*; *n*, *sterno-maxillaris*; *o*, *levator humeri* or *deltoides*. The masseter (*a*), forms the cheek of the horse, extending along a ridge by the side of the head, below the eye to the rounded angle at the rear of the lower jaw; its function is to close the jaw. The temporal muscle, (*b*), also assists in the action, and the dimpling seen above the eye in the process of chewing, arises from the action of this muscle while opening and closing the jaw.

The action of the muscle *orbicularis* is to close the eye-lids. Above the eye, passing inward and upward, over this muscle is the *levator* muscle (*d*). Its office is to raise the upper lid.

The muscles of the ear are not conspicuous. One of them proceeds from the base of the ear, extends forward and turns the ear forward. The second, situated behind the ear, turns it inward and backward, while the third muscle, a narrow strip, descends at the back of the cheek, and turns the ear outward.

The muscular covering of the frontal and nasal bones is not prominent and does not require mention here.

Muscles of the Nose and Lips.—The muscles of the nose and lips are important, since on them depend the act of gathering food, and also the expansion and contraction of the nostrils in breathing. They are also



CUT 3.—MUSCLES OF THE HEAD AND NECK

an index, together with those of the ears, in discovering much of the temper of the horse. *Orbicularis oris* (*e*) is one of the most important of these. It entirely surrounds the mouth, and by its action closes or opens the lips. A pyramidal muscle (*dilatator naris lateralis*) (*f*) covers the whole of the nostril, and also raises the upper lip.

The muscle shown at *h* (*nasalis labii superioris*) extends from a depression in front of the eye towards the angle of the mouth and divides

into two parts to permit the passage of the side dilator of the nostril (*f*), one branch passing straight to the corners of the mouth: its use being to raise it. The other branch expanding under the side dilator, not only assists in dilating the nostril, but also in lifting the upper lip.

The under lip is drawn back by the narrow muscle (*i*), which is inserted into the lip below the angle of the mouth. Passing along the side of the jaw, it disappears under the *masseter* or cheek muscle (*a*).

Muscles of the Neck.—One of the principal muscles of the neck rises from the transverse processes of the first four or five dorsal vertebræ, page 54 (3), and also from the five lower bones of the neck (2), same page. The fibers from these two points, uniting form one large muscle, which, in fact, makes up the principal lower part of the neck, and which, diminishing in size as it passes towards the head, terminates in a tendon inserted in the (*occipital*) bone covering the back of the head. See page 61 (*c*). Immediately above is the muscle *splenius* (*k*), page 71. It is used for raising the head. This muscle arises from the entire length of a strong and elastic ligament (*ligamentum nuchæ*), having its origin from the back of the occipital bone, to which it is attached immediately below the crest. At first cord-like, it passes over the first joint of the neck and adheres strongly to the second bone of the neck, on which the principal weight of the head is thrown; it thence proceeds backward up to its termination on the elevated spinous processes of the bones of the withers. Thus the withers have to support the entire weight of the head and neck, when held in their usual position.

To return to the *splenius*. It is inserted directly into all the bones of the neck except the first, but having with this and the temporal bone, a separate and distinct connection. To its form and development, the muscularity and beauty of the neck are chiefly due. The thick crest and massive neck of the stallion, is principally due to its great development. If overloaded with cellular tissue or fat, the neck will be clumsy. These facts cannot be too carefully borne in mind, for whatever the condition or breed of the horse it is this muscle which gives character to the neck.

Behind the *splenius*, and extending along the upper margin of the neck, is a muscle (*levator anguli scapulae*) (*l*). Inserted in the back of the head, and attached to the first four bones of the neck and to the great ligament, it descends to the shoulder, out of sight. Its action is reciprocal on the neck and shoulder, according as one or the other may be fixed at the time.

Muscles of the Front of the Neck.—On page 71 (fig. 2, m.) immediately below the head at its junction with the neck, its upper extremity, conspicuous, is the muscle *hyoideus*. It is attached to the hyoid bone of

the tongue, which it retracts; descending along the front of the neck to the shoulder, it is for the greater part of its length, covered by other muscles. The principal depressor muscle of the head, called *sterno-maxillaris*, (*n*,) partly covers the last named. It rises from the upper part of the point of the breast, (*sternum*), covers the lower front of the neck, proceeds upward by the side of the retracting muscle of the tongue, and is inserted by a flat tendon into the rear angle of the lower jaw. It is not a large muscle, since it requires but little force to depress the head.

Extending from the back of the head and upper part of the neck, along the front of the shoulder, to the top of the fore leg, and beyond the *sterno-maxillaris*, is a long and important muscle (*levator humeri*, or *deltoïdes*) page 69 (*o*) having a double function to perform. The head being held up by its own proper muscles, it then becomes the fixed point from which the *levator humeri* raises the shoulder. But its action can be reversed. With the shoulder as a fixed point, the head can be depressed by means of a small slip of the muscle being carried forward to the point of the breast bone to bear the head in that direction. In conclusion, it may be stated that the muscles are *all arranged in pairs*, sometimes, but rarely, in contact; so that in speaking of them in the singular, their position and function is to be understood as applying to each side of the animal.

III. Muscles of the Shoulder and Back.

In every science the use of Latin has generally been adopted in naming the several parts and objects. The reason of this is that the true and exact meaning of the names is thus preserved with scientific accuracy, which could not always be the case if these terms were loosely translated from and into the various languages of the earth. In English and in other languages there are several names for one and the same object. Once named in scientific nomenclature the object remains fixed and clearly defined by its scientific name as long as the science lasts. Sometimes it would take many words to express the same meaning, and when necessary the meaning of the scientific term is explained. Sometimes there is no common name, and hence we are obliged to depend upon the Latin name. For instance the *trapezius* is the muscle whose office it is to raise and support the shoulders, assisted by another important muscle, (*serratus major*) (*g*,) a muscle that is hardly visible externally, since it is situated between the ribs and shoulder blades, and forms the main connection between them. Hence in explaining the illustrations we use these terms, explaining them, so far as may be necessary, in the body of the text.

The muscle, *trapezius*, previously noticed rises from the ligaments of the neck, and the principal bones of the withers, terminating in a pointed shape on a prominent part of the shoulder blade, and is at x.



CUT 4.—SHOWING MUSCLES OF SHOULDER AND ADJACENT PARTS

The muscle occupying the outer surface of the shoulder blade (*scapula*,) on the front side of the spine or ridge of that bone is termed *antea spinatus*, and is shown at *b*, on pages 69, 74 and 76. It proceeds to the lower bone of the shoulder, and dividing into two parts, is inserted into the two prominences in front of it. Its use is to extend the bone forward.

Situated on the other side of the shoulder blade and inserted into the upper and outer head of the bone, drawing it outward and raising it, is the muscle called *postea spinatus*. Behind it is a small muscle (*teres minor*) (*d*,) or little pectoral. Its office is to draw the shoulder forward towards the breast.

Inside the arm, at its junction with the body, is an important and conspicuous muscle, the large pectoral muscle (*pectoralis major*) shown

at pm, page 76. This muscle pulls the whole fore leg inwards keeping it in a line with the body, so as to induce an even and regular action of the limb.

On the outside of the shoulder, and easily seen when a horse is in motion, are two muscles, (e) (*anconeus longus*) and (f) *anconeus externus*) whose office is to straighten and extend the arm. That is, to bring the front limb down perpendicularly, and in a line with the lower bone of the shoulder (*humerus*). Arising from the lower bone of the shoulder, they are inserted into the point of the elbows. The muscles which bend the arm upwards are not visible in the living animal, being almost entirely covered by those of the shoulder.

The principal muscle of the back is the *latissimus dorsi*, shown on page 74 as extending from the shoulder to the haunch, and on pages 69 and 76 at the *; it is strongly attached to the processes of the back bones and ribs, and is employed in raising the fore and hind quarters, and in rearing and kicking. The portion which comes nearest the surface is that part which is covered by the saddle. No portion of it, however, is distinctly apparent without dissection.

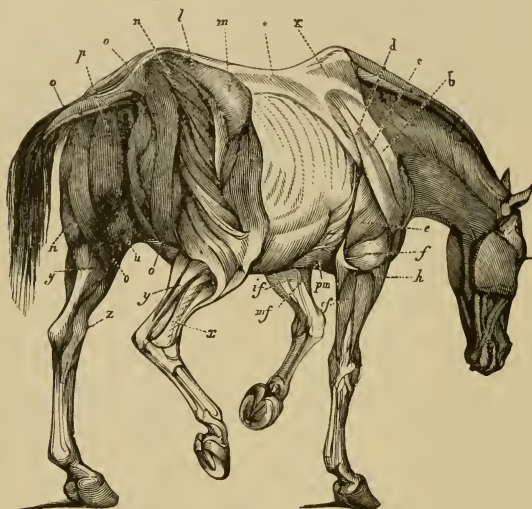
IV. Muscles of the Hinder Parts.

The muscles shown in cut 4, are: *x*, *Trapezius*; *a*, *Pectoralis minor*; *b*, *Antea spinatus*; *c*, *Postea spinatus*; *d*, *Teres minor*; *e*, *Anconeus longus*; *f*, *Anconeus externus*; *g*, *Serratus major*; *, *Latissimus dorsi*; *pm*, *Pectoralis major*. These two latter are figured in the illustration on page 76

The Muscles of the Hind Quarters.—The illustration on page 77 shows all the prominent muscles of the hind quarters laid bare. Their names and references are as follows: *l*, *Gluteus externus*; *m*, *Gluteus medius*; *n*, *Triceps femoris*; *o*, *Biceps*; *p*, *semi Membranosus*, (shown on page 69); *q*, *Musculus facie latæ*; *r*, *Rectus*; *s*, *Vastus externus*; *u*, *Gracilis*; *v*, *Extensor pedis*; *w*, *Peronæus*; *x*, *Flexor pedis*; *y*, *Gastrocnemii*; *z*, *Flexor metatarsi*.

The Muscles Described.—The muscles of the hind parts are mostly strongly marked, and the situation of the principal ones will be easily recognized. With them will be included those concerned in or connected with the motion of the hinder limbs. Among the most prominent of the muscles on the front and outer parts of the haunch is that one (the *Gluteus medius*) arising from the processes of several of the vertebrae of the loins and from the prominent parts of the *ilium*, (the side bone of the pelvis heretofore described) and terminating at its insertion in the great trochanter or projection on the upper bone of the thigh (*femur*).

It is an important and powerful muscle and is used in raising and bringing forward the upper bone of the thigh. It has been not inaptly called the kicking muscle, and is shown at *m*, on pages 69 and 76 and 77. The *gluteus externus*, *l*, is a slender muscle attached to the kicking muscle and has a similar origin and function. It may be called the assistant kicking muscle.



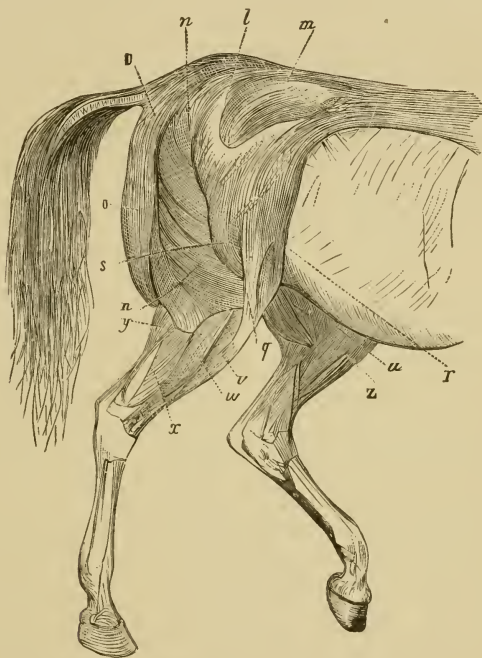
CUT 5.—REAR SIDE VIEW OF THE MUSCULAR COVERING.

The Three Headed Muscle.—When the horse is in motion a conspicuous muscle of the hind-quarter is the three headed muscle of the thigh (*triceps femoris*), shown at *n*. This is really three muscles in one, each having a common origin and united together. It comes from several of the bones of the spine, including some at the root of the tail, and from various parts of the haunch bone. It curves downwards and forwards, dividing into three heads. These are inserted broadly into the upper part of the lower bone of the thigh behind the knee (*stifle joint*). Its action straightens the leg, and it has great power in carrying the animal forward, for while the *glutei* muscles bend the leg before it takes the spring, the *triceps*, acting in opposition, forces the leg straight and lifts the body forward. The hinder margin of this muscle may be seen in all horses, parallel to the outline of the buttock, but it is prominent in racing

and trotting horses, when proper exercise has brought them into condition.

Parallel with the *triceps* and immediately behind it is the *biceps*, shown on pages 69, 76 and 77, at *o*. Springing from the sacrum and the first bones of the tail, it descends to the inner side of the lower bone of the thigh, forms the outer rear border of the haunch and assists in straightening the leg.

Another flexor of the leg, forming the inner rear border of the haunch, and uniting on the mesial line with its fellow muscle of the other quarter is the *semi membranousus*, shown on page 76, at *p*, and also on page 69, at *p p*.



CUT 6.—SHOWING MUSCLES OF THE HIND QUARTERS.

At the outer front part of the haunch, is a peculiar muscle which binds down and secures the other muscles in front of the haunch. It is the *musculus fasciæ late*, shown at *q*, pages 69 and 77. It arises from the forward portion of the crest of the *ilium* and is enclosed between two layers of tendinous substance which disappear below the stifle.

The *Rectus*, *r*, forms the front edge of the thigh, and proceeds from the *ilium*, in front of the hip joints, and is inserted into the knee cap, (*patella*) at the stifle joint. This muscle forms the front edge of the thigh.

The *vastus extensus*, *s*, is a large muscle behind the *rectus* and is also inserted into the patella. Only a part of it can be seen externally, and both this and the *rectus* are powerful extensors of the thigh.

The *sartorius*, or tailor's muscle, is a narrow strip descending inside the thigh, and terminating just below the stifle joint. It bends the leg, (*tibia*), and turns it inward. It is hardly visible. The *gracilis*, *u*, lies by the side of this muscle, and at the rear of it, occupying the principal surface of the inside of the thigh, (*femur*). It is inserted into the upper part of the lower bone of the thigh, (*tibia*).

V. Muscles of the Fore Limbs.

These have been delineated on page 63 in connection with the corresponding bones; their names are there given. The elbow is the lever into which the muscles for extending the arm are inserted. They are of great power, and they extend up to the muscles of the shoulder, with which they are connected in reciprocal action.

VI. Muscles of the Leg and Foot.

The most important of the muscles which move the lower portion of the leg and foot, is the *extensor pedis*, seen on pages 69 and 77, at *v*. It comes from behind the stifle, from the extremity of the two bones of the thigh, (*femur* and *tibia*). Descending to the hock, its tendons pass under a sheath, confining it to its place in front of the joint. Thence it continues to the foot, and, widely expanding, is inserted in front of the coffin bone.

The *peronæus*, seen at page 69 and 77 at *w*, comes from the *fibula*, and taking much the same course as the last-named muscle, but in a more lateral direction, the tendon passes on the outside of the hock and descends to the foot with the *extensor pedis*. These two muscles act to lift the foot forward. Between them is another narrow muscle, which acts with them, and the tendon of which is seen just above the hock.

One of the principal muscles for bending the foot is the *flexor pedis*, shown at pages 69 and 76 and 77 at *x*. Rising from the upper part of the tibia, it becomes tendinous before reaching the hock, and as a round, large cord passes through a groove at the back of that joint. Then descending behind the shank bone, it is inserted in the two pasterns.

At the back of the thigh (*tibia*) may be seen the extremities of the *gastrocnemii*, pages 69 and 76 and 77 at *y*. The united tendons (*tendon*

Achilles) pass to the point of the hock where they are inserted. In the horse the *gastrocnemii* are important muscles, and are aided by the *plantaris*.

The *flexor metatarsis* is the muscle which bends the leg. It is on the inside of the thigh (*tibia*), and is shown on pages 69 and 76 and 77 at *z*. Originating above the stifle on the upper bone of the thigh (*femur*), it is inserted into the shank and inner splint bone.

VII. Studying the Structure.

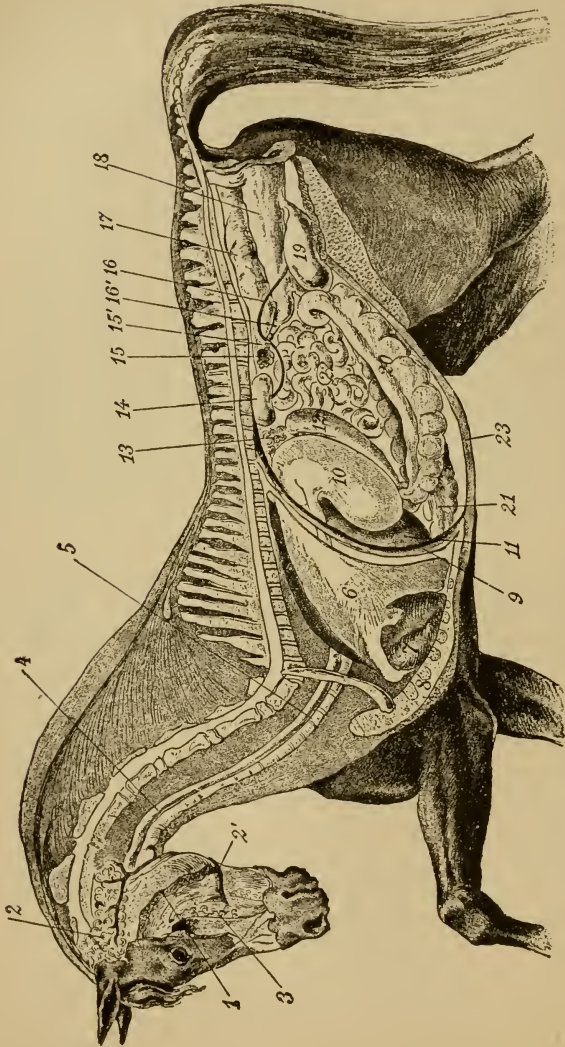
Thus we have carefully gone over the bony and muscular structure of the horse, giving only such information as is indispensable for every horseman to have. The artist, from careful study of the anatomy and physiology of an animal, is able to draw and paint it correctly. The horseman should study it from the same standpoint. Thus both will be enabled to carry in the mind the appearance of a well-developed horse. The surgeon studies anatomy from a somewhat different standpoint. He wants to understand the various articulations, muscles, arteries, tendons, nerves, ganglia and viscera, with a view to surgery and the cure of diseases. The horseman and breeder studies anatomy and physiology to arrive at a better understanding of what goes to make up a good animal, endowed with speed, style, or development for draft.

VIII. Internal Economy of the Horse.

We next discuss the internal economy of the horse. For a better understanding of the subject, we give a longitudinal section of the horse, showing *Thorax* (cavity of the chest, windpipe, etc.), *Abdomen*, *Pelvis*, etc.—See next page.

POSITION OF THE INTERNAL ORGANS OF A HORSE (HALF).

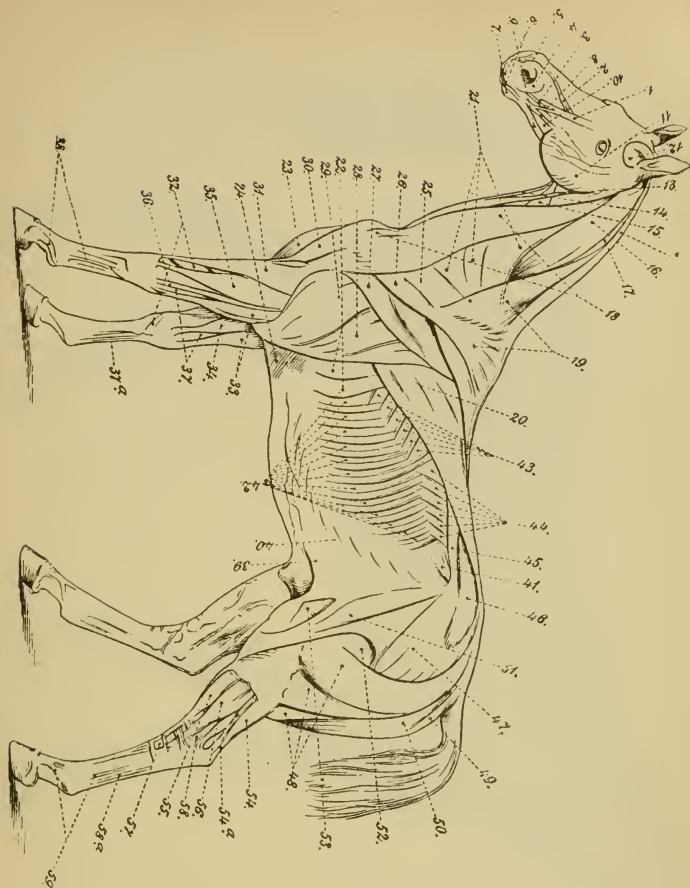
(1) External Masseter Muscles, cut off. (2) Parotid Gland. (2') Parotid Duct. (3) Buccal Glands. (4) Oesophagus. (5) Trachea. (6) Lungs. (7) Heart. (8) Sternum or Breastbone. (9) Diaphragm dividing the hollow of the chest from the stomach. (10) Stomach. (11) Liver. (12) Spleen. (13) Pancreas. (14) Kidney. (15) Ovary. (15') Oviduct (16) Ureter. (16') Position where the Oviduct enters the Uterus. (17) Rectum. (18) Vagina. (19) Bladder. (20) Colon. (21) Caecum. (22) Small Intestines. (23) Abdominal Wall.



POSITION OF THE INTERNAL ORGANS OF A HORSE (HALF)



FRENCH DRAFT HORSES.
Noted Prize Winners.—Specially photographed for this work.



THE EXTERNAL MUSCLES OF THE HORSE.

- 1.—Levator Labii. 2.—Nasalis Longus. 3.—Dilator Naris. 4.—Alae Naris. 5.—Insertion Levator Labii. 6.—Commissure. 7.—Orbicularis Oris. 8.—Depressor Labii. 9.—Buccinator. 10.—Zygomaticus. 11.—Masseter. 12.—Attollens. 13.—Tendon of Sterno-Maxillaris. 14.—Sterno-Maxillaris. 15.—Subscapulo-Hyoideus. 16.—Splenius. 17.—Complexus Major. 18.—Levator Humeri. 19.—Trapezius. 20.—Latissimus Dorsi. 21.—Cervical Serratus Magnus. 22.—Dorsal Serratus Magnus. 23 and 24.—Pectoralis. 25.—Antea Spinatus. 26.—Postea Spinatus. 27.—Teres Externus. 28.—Caput Magnum. 29.—Caput Medium. 30.—Humeralis Obliquus. 31.—Extensor Metacarpi Externus. 32.—Extensor Metacarpi Obliquus. 33.—Flexor Metacarpi Externus. 34.—Flexor Metacarpi Internus. 35.—Extensor Pedis. 36.—Flexor Metacarpi Medius. 37.—Extensor Suffraginis. 37a.—Flexor Pedis Externus. 38.—Flexor Pedis Internus. 39.—Abdominal Wall. 40.—Obliquus Abdominis. 41.—Obliquus Abdominis. 42.—Intercostales. 43.—Superficialis Costarum Anterior. 44.—Superficialis Costarum Posterior. 45.—Transversalis Costarum. 46.—Gluteus Magnus. 47.—Gluteus Externus. 48.—Triceps Femoris. 49 and 50.—Biceps. 51. 52 and 53.—Vastus Externus. 54.—Gastrocnemius. 54a.—Gastrocnemius Tendon or Hamstring. 55.—Extensor Pedis. 56.—Peroneus. 57.—Peroneus Tendon. 58.—Flexor Pedis. 58a.—Flexor Pedis Externus. 59.—Flexor Pedis Internus.

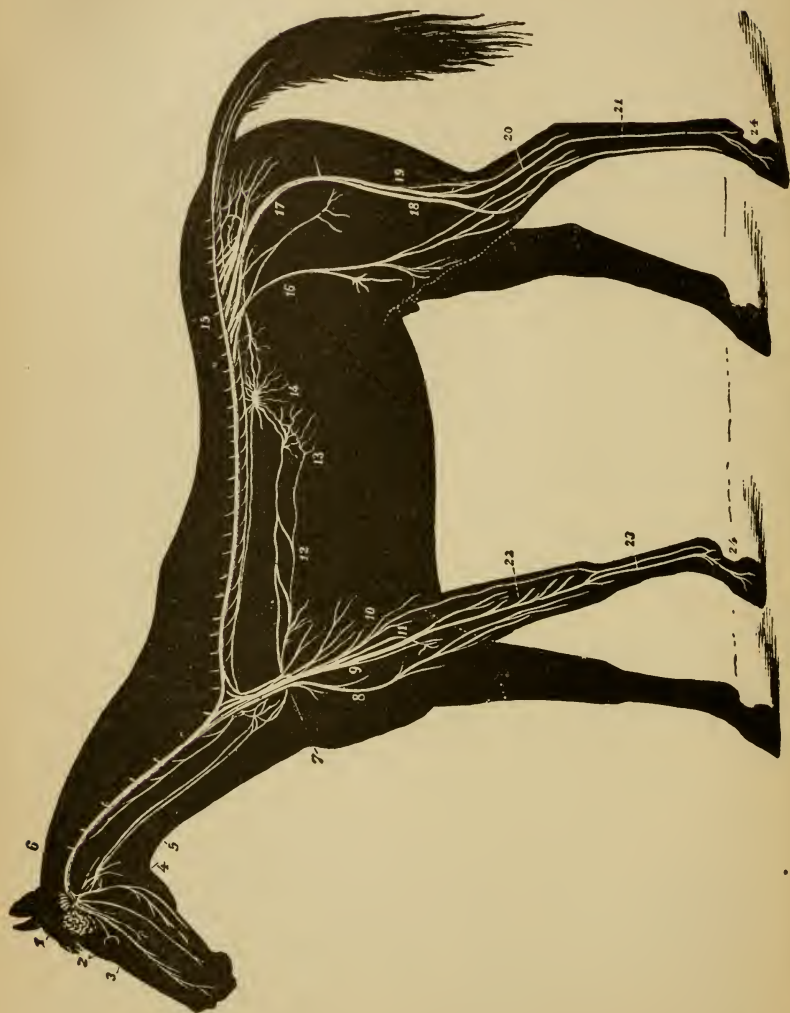


PLATE I.--NERVOUS SYSTEM.

EXPLANATION OF PLATE I.—NERVOUS SYSTEM.

With the exception of the spinal cord and the corresponding portion of the great sympathetic, as with the blood vessels, all the other nerves are double and symmetrical, being found in each side of the body.

1. Brain.
2. Optic nerve.
3. Superior maxillary nerves.
4. Inferior maxillary nerves.
5. Par vagum of pneumogastric, etc.
6. Spinal cord.
7. Brachial plexus.
8. Prehumeral nerve.
9. Anterior brachial.
10. Radial nerve.
11. Cubital nerve.
12. Pneumogastric nerve.
13. Gastric portion of the solar plexus.

14. Semi-lunar ganglion—the center of the solar plexus.
15. Sacro-lumbar plexus.
16. Anterior femoral and saphena nerves.
17. Sciatic trunk.
18. Small femoro-popliteal nerve.
19. Great femoro-popliteal nerve.
20. Posterior plantar nerve.
21. Posterior internal tibial nerve.
22. Internal radial nerve.
23. Anterior plantar nerve.
24. Plantar nerves.

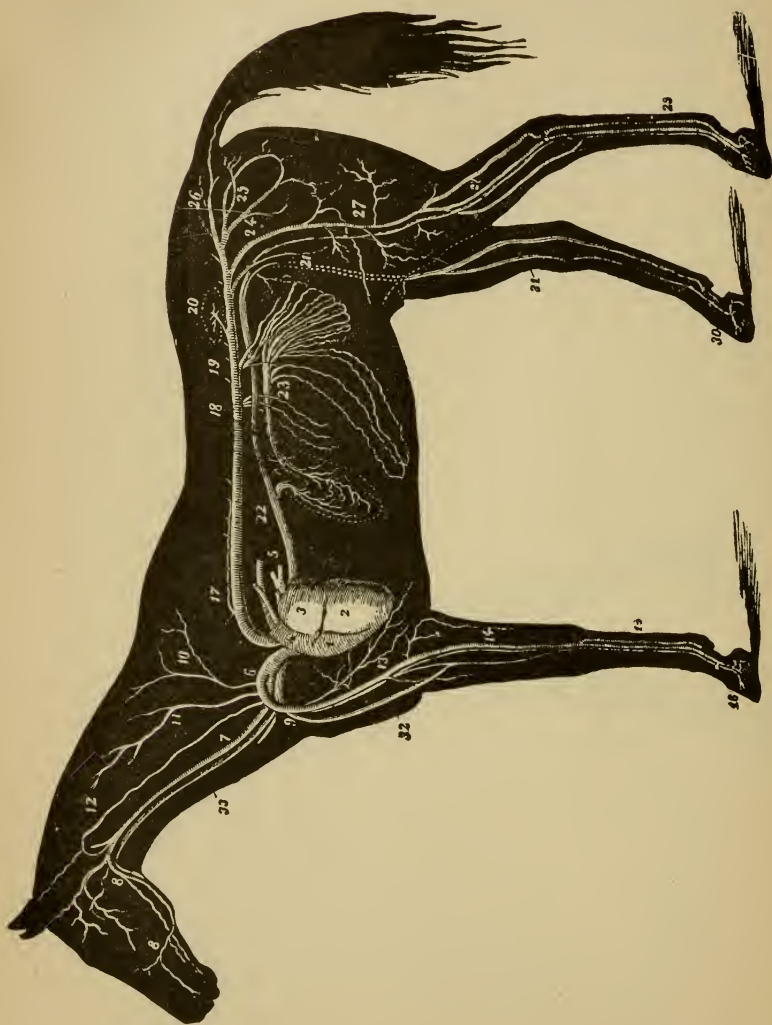


PLATE II.—CIRCULATORY APPARATUS.

EXPLANATION OF PLATE II.—CIRCULATORY APPARATUS.

The left anterior limb has been removed to show the vessels on the inner aspect of the right limb.

With the exception of the two aortæ, the vena cava, and the vena portæ, all the other vessels are double and symmetrical; *i. e.*, found on each side of the body.

- | | |
|----------------------------------|--|
| 1. Heart (right ventricle). | 18. Cœliac trunk distributed to the stomach. |
| 2. Heart (left ventricle). | 19. Mesenteric vessels. |
| 3. Heart (left auricle). | 20. Renal artery. |
| 4. Pulmonary artery. | 21. Spermatic artery. |
| 5. Pulmonary veins. | 22. Posterior vena cava. |
| 6. Anterior aorta. | 23. Vena portæ. |
| 7. Carotid artery. | 24. External iliac artery. |
| 8. External maxillary artery. | 25. Internal iliac artery. |
| 9. Left axillary artery. | 26. Lateral sacral artery. |
| 10. Dorsal axillary artery. | 27. Femoral artery. |
| 11. Superior cervical artery. | 28. Posterior tibial artery. |
| 12. Vertebral artery. | 29. Metatarsal artery. |
| 13. Humeral artery. | 30. Venous network of the foot. |
| 14. Radial artery. | 31. Internal saphena vein. |
| 15. Metacarpal artery. | 32. Superficial brachial vein. |
| 16. Coronary, or digital artery. | 33. Jugular vein. |
| 17. Posterior aorta. | |

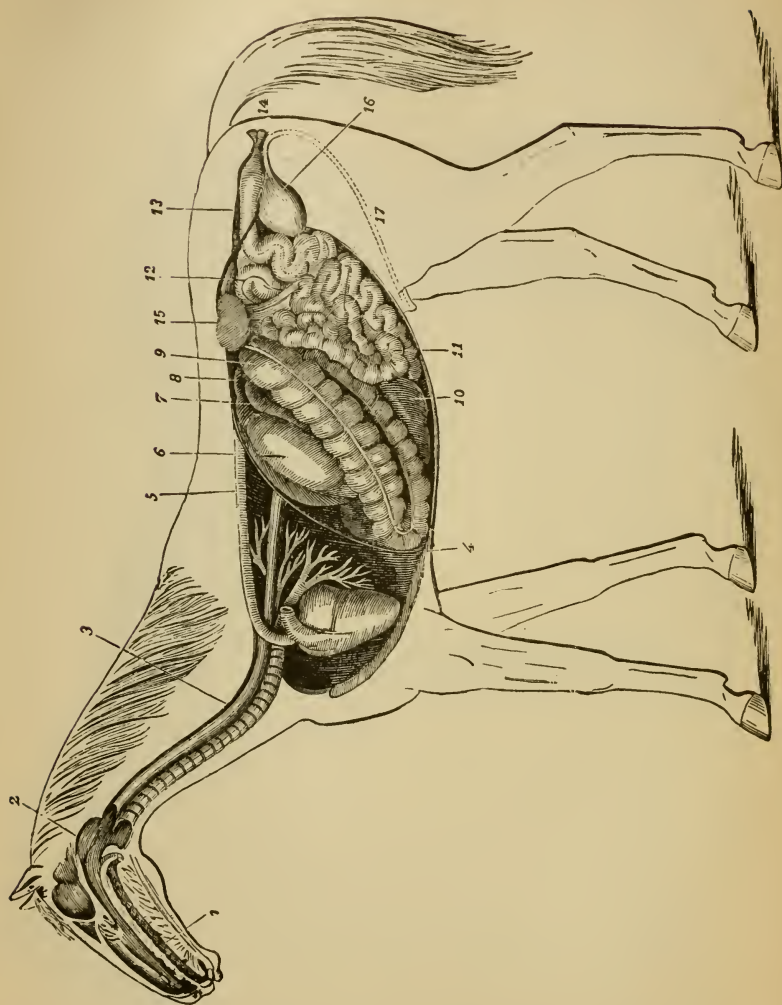


PLATE II.—DIGESTIVE APPARATUS.

EXPLANATION OF PLATE III.—DIGESTIVE APPARATUS.

- | | |
|----------------------------|----------------------------------|
| 1. Mouth. | 10. Cæcum. |
| 2. Pharynx. | 11. Small intestine. |
| 3. Oesophagus. | 12. Floating colon. |
| 4. Diaphragm. | 13. Rectum. |
| 5. Spleen. | 14. Anus. |
| 6. Stomach. | 15. Left kidney, and its ureter. |
| 7. Duodenum. | 16. Bladder. |
| 8. Liver, upper extremity. | 17. Urethra. |
| 9. Large colon. | |

CHAPTER IV.

OUTWARD APPEARANCE OF THE HORSE AS INDICATING VALUE.

I. ACTION THE FIRST REQUISITE OF A GOOD HORSE.—II. FAST WALKING HORSES.—III. HORSES FOR DIFFERENT KINDS OF WORK.—IV. THE HEAD ILLUSTRATED OUTWARDLY.—V. THE BODY AND LIMBS.—VI. BAD FOREQUARTERS.—VII. THE BODY AS SEEN FROM THE FRONT.—VIII. WHAT A CRITICAL HORSEMAN SAID.—IX. FRONT VIEW, SHOWING BAD FOREQUARTERS.—X. THE HINDER PARTS ILLUSTRATED.—XI. THE PROPELLING POWER.—XII. WHAT THE ANCIENTS KNEW OF HORSES.—XIII. WHAT ONE NEED NOT EXPECT.

I. Action the First Requisite of a Good Horse.

A horse, like every other farm animal, is to be bought with a view to the use for which he is intended. The buyer must therefore know what he wants the animal for; if for slow draft a very different frame will be required from that needed when fast work is to be done; and yet the general symmetry of the animal must be looked to in every case. Further on the various breeds will be illustrated. The present chapter will deal simply with the outward conformations, showing good and bad forms, just as the preceding chapters have illustrated the bony structure and the muscular development. Action is of course the first requisite whatever use the horse is intended for, and fast walking is the groundwork upon which to build all other action. We give on the next page an illustration of a horse, as seen in a fast walking gait.

Action in General.—Good action can never be gotten out of a lazy, lubberly horse. The animal must have spirit and ambition, whatever the breed. Action is of only two forms: smooth, safe, low action, and high, showy, or parade action. The latter is never admissible, except when the horse is intended only for show and parade, or for a certain class of carriage horses, or for slow driving or riding in parks or other places of public resort. It is unsafe, unless the animal be intelligent and naturally sure-footed; for a high stepping dolt is generally bad-tempered, and as unsafe as he is ungainly. When slow-and-safe and fast-and-safe action are combined in the same animal, he is invaluable and should not be lightly parted with.

Good action is attained when all the limbs are moved evenly and in accord one with the other, the hind limbs being kept well under the animal, ready for any emergency. The action should be square in walking or trotting and without paddling with the fore legs, or straddling behind. It is true that paddlers are staunch and sure footed, and horses that straddle behind are sometimes fast, but this is in spite of such action, and not on account of it. They are never admissible, either in fine harness or under the saddle.

II. Fast Walking Horses.

It is seldom one sees a horse that will walk four and a half or five miles an hour in regular 1-2-3-4 time, nodding his head in cadence. Yet any horse that conforms to the configuration shown in the cuts hereafter



HIGHLAND CLYDESDALE STALLION

Specially photographed for this work.

given in this chapter may easily be taught to do it, either under the saddle or in harness. Some horses may be taught to walk six miles an hour, but they are rare. As a rule, fast-walking horses may be taught to trot fast, though some fast-walking horses are too broad-chested, to trot fast,

and they will roll in galloping. It is for this reason that we give the illustrations, showing the perfect conformation for perfect action. A horse that is good at all gaits, is a horse perfect in his conformation. Hence, a perfectly-formed horse will well repay careful training, for such a one will bring a large price for the time and labor spent upon his education; or if it be a mare that is to be kept for show, and later for breeding, the labor of training will not have been thrown away.

III. Horses for Different Kinds of Work.

Speed and bottom, which indicate the superior bone and muscle of good breeding, combined with great lung and heart power, whatever the breed, are what is desired in a horse. The nearer the animal comes to the illustrations given, the better will he be for general utility, and measurably so whatever the labor desired. The horse for heavy draft will be coarser, more stocky, heavier in the bone, not so flexible in the limbs, more upright in the shoulder, longer-haired, and perhaps with less courage. Occasionally, however, a thoroughbred makes a first-class work horse, if trained to get down steadily to the work. This very flexibility enables him to take a hard and long-continued pull without injury, and it brings the oblique shoulder of the blooded horse straight in the collar. Yet thoroughbred horses are not draft horses, and were never intended to be, though they have imbued nearly every valuable breed existing to-day with some of their best characteristics.

IV. The Head Illustrated Outwardly.

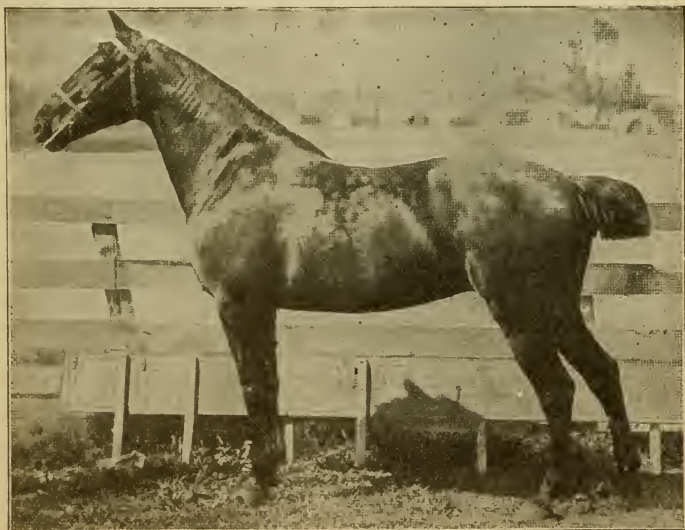
The head is the seat of intelligence in all animals, and without intelligence we cannot have a good servant. The illustrations on pages 98 and 99 show the formation of heads from good to bad. Those on page 98 show the perfectly-formed head of a well-bred horse, presenting a side and front view, that may be taken as a type constituting perfection, as near as may be. The side view exhibits the head fine and tapering to the muzzle, and the chin handsomely developed. The brow is smooth, distinct, and yet not heavily prominent. The eye is large, full, clear, and has a placid, intelligent expression. The ears are fine and flexible, rather large, but well pointed, and alive with intelligent motion. The jaw is strong but fine. Observe the muscularity of the neck, and at the same time, its lines of swelling and delicate grace. Observe especially the manner in which the head is set upon the neck. Again, it will be seen that the face is dished slightly, showing spirit, tempered to intelligent tractability.

Now take the front view of the same head. Observe the great smooth swelling forehead, looking really broader between the eyes than it is. Why? It will be seen that the eyes are apparently at the side of the



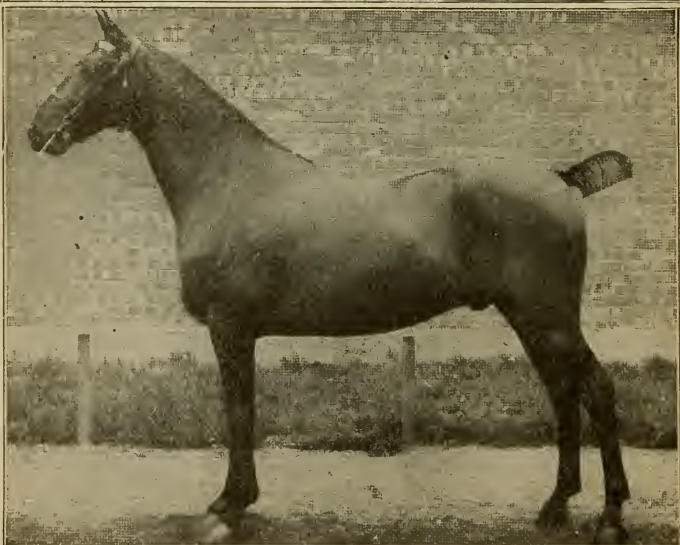
A CHOICE WAGON HORSE.

Note the conformation of great physical endurance indicated by his obliquely set shoulder, depth and compactness of body, shortness of back, closeness of coupling, unusual length of croup, well set pasterns, and good shaped feet. His height is 16 hands and his weight 1450 pounds.



CHOICE COACH OR BROUGHAM HORSE.

Note the compactness and smoothness of form with rotundity of body. Height, 15-2 hands; weight, 1175 pounds. This horse meets the principal requirement of high action combined with beauty of form. The whole outline of the horse is carried out in easy, graceful curves pleasing to the eye.



CHOICE COBS.

Note the compactness and smoothness of form with rotundity of body. Cobs are small coach horses that are driven singly, in pairs, or tandem fashion (one in front of the other) usually by ladies, though they may be used by gentlemen as well. They are small horses of a stocky build, plenty of quality, good length of neck, a neat head, and high action. They stand 14-1 to 15-1 hands high and weigh from 900 to 1150 pounds.

The action of the Cob should be much the same as that of the coach horse, or a little higher both above and behind. As horsemen say, "They must be able to get away smart"—they should be quick on their feet and able to move off at a "good clip," carrying their knees high and bringing their hocks well under the body.

head, and yet look straight forward. The temporal bones at the side of the eyes, and the occipital bone at the top of the head between the ears, are prominent. The nostrils and lips are large and flexible, and if one could turn back the folds of the nostrils at the ends, we might see a moist and healthy inside surface. In the living head corresponding to the figure, all this would be apparent.

If we examine the side and front views of the heads shown on the opposite page, the side view at the top indicates a head somewhat heavy, with the nose and lower jaw too thick. The nose swells out above the nostrils. The face is not dished, but is depressed. The eyes are bright, but with a somewhat wild expression. The eyebrows are prominent, and the head broad. The ears are thrown back, and the muzzle is cruel in its expression. The head is set on the neck at too great an angle. The expression, as a whole, is indeed that of an intelligent and spirited horse, but it is the intelligence of malice, and the spirit of self-will.

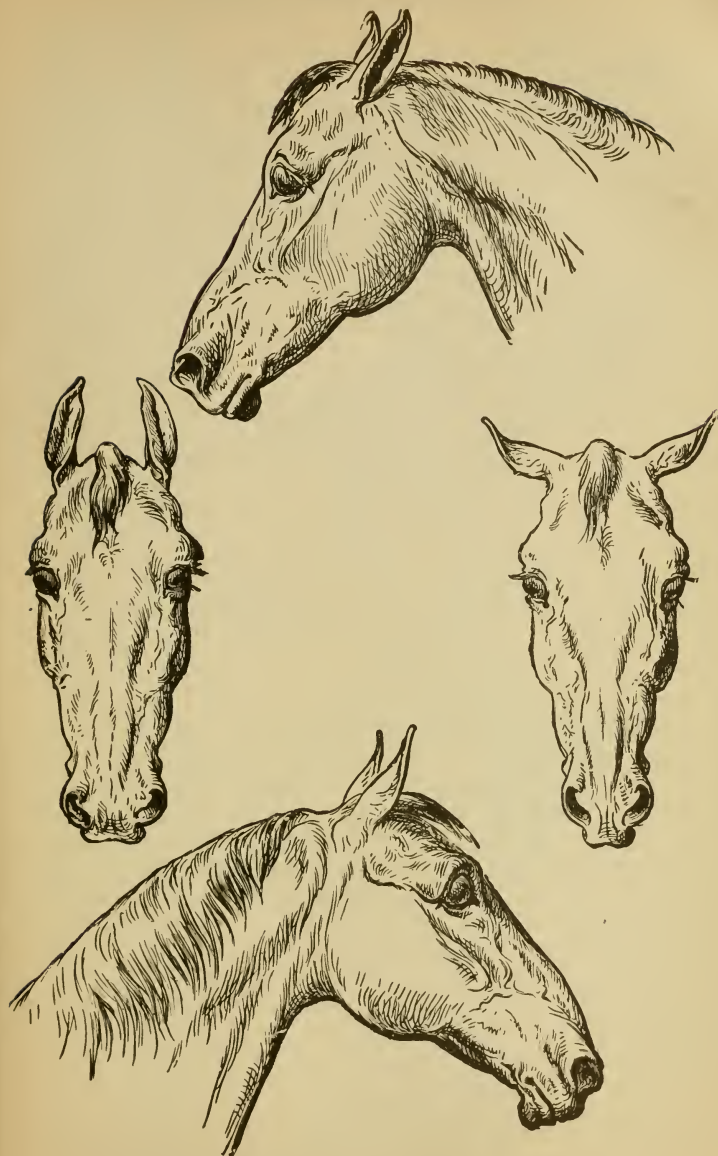
In the front view, it will be seen that the eyes are too close together, and are in the front of the head rather than the sides. The ears are pointed close together and backward, as though the animal only wanted the chance to do mischief. The face is full of strong lines, but not smooth ones. They are those of a stubborn animal that may do as you wish, if he cannot or dare not do otherwise.

The next figure to the right shows not only a cruel, but a stupid expression. There is a lack of intelligence, which, in the horse, means spirit, courageous docility, and a generous desire to do the will of a kind master. While this head does not show particularly bad form, yet the general expression, drooping ears, and the dull eye, show less character than the average horse should possess.

There is yet another form, and a worse one. It is shown at the bottom of the page. Here we have self-willed obstinacy, and a wild, sulky disposition. The profile is curved, giving a Roman nose, and the eyebrows are raised, indicating self-will and wildness. The firm jaw and lower face are cruel. It is a face that never goes with a horse safe to drive single, or to ride, except in the hands of one who is perfectly master of himself, and at the same time, always watchful and firm. Thus we might go on describing all the peculiarities of temper down through nervous timidity, as shown by the thin, clean face, the cowardly head, the idiotic, and even the head showing evidences of insanity; for that there are horses subject to hallucinations, aberrations of mind, and even actual insanity, there is no doubt. The cowardly, the vicious, and the idiotic horse is never safe. The aberrant and the insane horse is always dangerous, even to the most practiced horseman, since neither caresses nor punishment avail. They will run their "muck" at any hazard.



SIDE AND FRONT VIEW OF HEADS—GOOD. (See Explanation.)



SIDE AND FRONT VIEW OF HEADS—BAD.

(See Explanation.)

V. Body and Limbs.

The figure given on page 97 shows a side view of the head, neck, shoulder, and fore limbs, as they should be seen in a perfectly formed animal. On page 102 are side views of the fore quarters of horses, even down to those which easily become distorted from labor or use. In the perfectly formed horse, the neck is muscular and fine at the top, where it joins the head. There is no useless flesh, though where it joins the shoulder it is full and yet fine in proportion. The shoulder is deep, oblique or slanting. The shoulder-blade is high, giving stability to, and at the same time fully supporting, the withers. The breast is prominent, but narrowing to the point where the legs leave the body. The arm is long, muscular, and tapering to the knee. The joints are large, but firm and compact. The fetlocks are long but flexible. The hoofs are rather large, and are round, deep, tough, and sound. It is the shoulder of a saddle horse, of speed, bottom and endurance, that is seen in the cut. Few horses, even of the highest class, possess this perfect ideal conformation. For the harness, the shoulder may be less oblique. The horse of all work, is more rigid and upright in limb and shoulder than the more speedy one; yet the illustrations we give may be taken as the standard in judging a horse intended for every kind of work. The general appearance of the best animals of the various breeds is shown by cuts in their appropriate places in this volume. A comparison will show that while there are differences, yet the rules here laid down will apply generally to all horses, modified only by the differences required to enable a particular breed to perform special labor. The trotting gait, as exhibited in a high-caste roadster, combining style with high action and great and long continued speed, would be execrable in a saddle horse. The springy, nervous action, and the long stride of the elegant saddle horse, would not go far towards pulling a dead weight, however honest and courageous the attempt might be—and we have seen thoroughbreds as honest and courageous at a dead pull as could be desired in a draft horse. While the highly-bred horse, especially the road horse, will fill more places than any other, yet the horseman must seek the animal best suited to his purpose. A study of the various models we present will enable any intelligent person to judge for himself, as well as an expert whom he would have to pay for his services. It should certainly prevent the palming off of any "sorry brute," as is often done upon those who, while scorning intelligent study, imagine they "know all about horses."

VI. Bad Fore-Quarters.

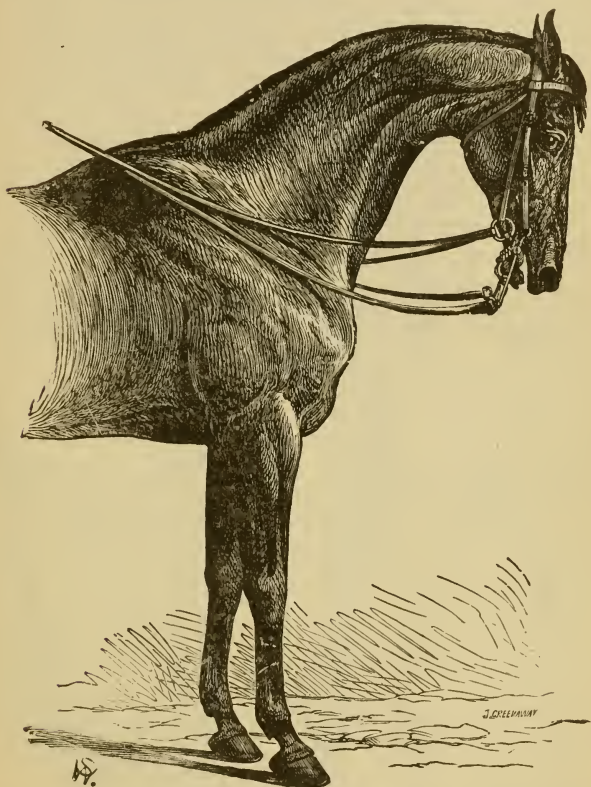
In the illustrations on page 102, the upper left hand figure shows a straight shoulder, the chest heavy, and the limbs placed too far under.



GERMAN COACH HORSES.
Noted Prize Winners.—Specially photographed for this work.

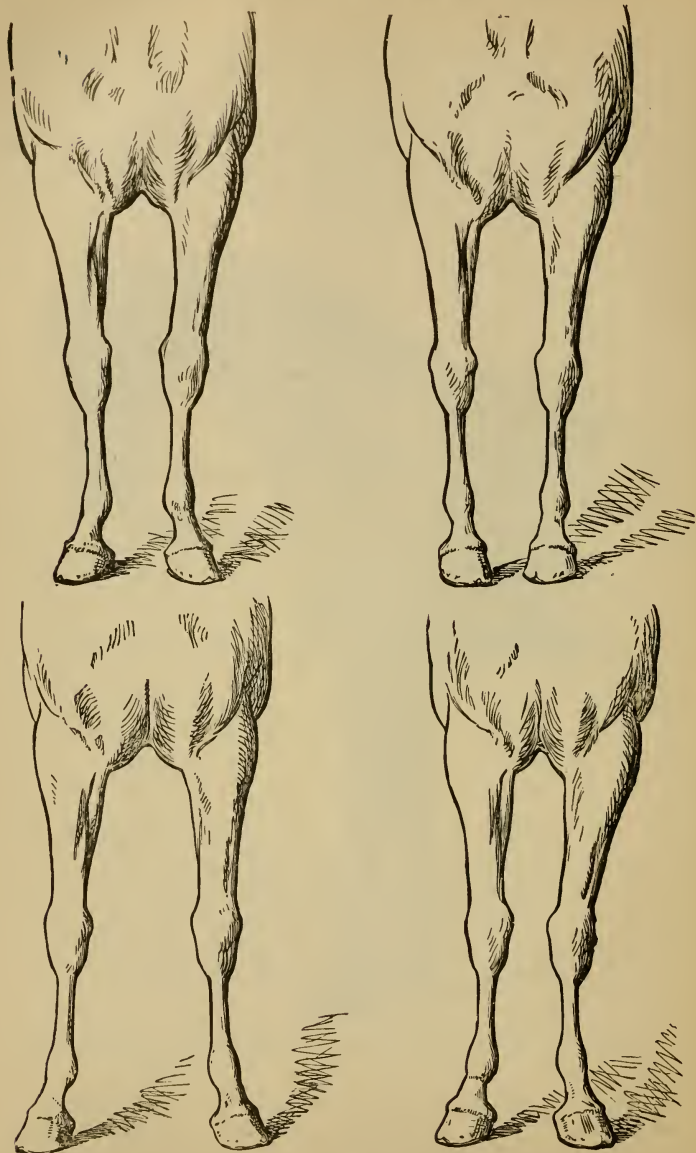
The arm seems long, but this is because it lacks muscular development. The shanks lack strength near the knee and pasterns, and there is a lack of strength generally.

In the upper right hand figure, the shoulder is not only bad, but the legs and pasterns are weak. There is too much length from the hoof to the joint above. To the uneducated eye the pasterns might seem flexible. It is, however, the flexibility arising from weakness. The



SIDE VIEW OF FORE QUARTERS, SHOWING A GOOD SHOULDER. (See Explanation).

muscles which carry the tendons lack strength, and with age the power of holding them in position will decrease. If the reader will turn again to the chapter illustrating the muscular development of the horse he will understand these points better.



FRONT VIEW OF FORE-QUARTERS, SHOWING DIFFERENT BAD CONFORMATIONS.



FRONT VIEW, SHOWING GOOD BREAST AND LIMBS. (See Explanation.)

The left hand lower figure exhibits a shoulder tolerably well placed, but the limbs are set too far under, and the pasterns are too straight, so that the animal appears to stand on his toes, and there is a general lack of muscle and sinew.

The lower right hand figure will convey a good idea of what old age, abuse, hard work and want of care will bring to either of the three pairs of shoulders and limbs just noticed. Abuse and ill-usage might ruin the living representative of the perfect figure on page 97 but the limbs would remain comparatively sound to the last.

VII. The Body as Seen from the Front.

In the illustration on page 99 the neck and shoulders are oval or egg-shaped. The chest seems narrow rather than broad, but this is because the muscular development about the breast bone is ample and full. Observe how grandly the muscle above the arm swells out, and what magnificent muscularity the arm presents with the two great thews running down to the knee. The joints are large and ample, as they should be, but also firm. The hoofs are tough and hard. Look carefully at the white space between the limbs running from the hoofs upwards. See how the neck, gradually rising from the chest, shows strength and a perfect proportion of one part to the other. The joints are compact and rounded, to meet the articulating shank and fetlock bones. The staunch strong hoofs are rather open behind, but show no indication of a flat foot. Set this and the preceding illustrations against the wall, retire until you get a perfect view, study them as an artist would a subject, compare them with the living animal, and, if you buy a horse for breeding or other use, buy as near to the model as possible.

VIII. What a Critical Horseman said.

One of the best authorities of all writers on the horse, a highly educated Englishman, whose estimate of an animal was always made from the standpoint of general excellence, the late Henry William Herbert, in his exhaustive work, "The Horse of America," says:

"The points of the physical structure of a horse on which the most, indeed the whole of his utility depends, are his legs. Without his locomotors all the rest, however beautiful it may be, is nothing worth. Therefore, to these we look first. The fore-shoulder should be long, obliquely set, with a considerable slope, high in the withers and thin above. The upper arm should be very long and muscular, the knee broad, flat and bony, the shank, or cannon bone, as short as may be, flat, not round, with clean, firm sinews; the pastern joints moderately long and oblique, but not too much so, as the excess produces springiness and weakness; the hoofs firm, erect or deep, as opposed to flat, and the feet

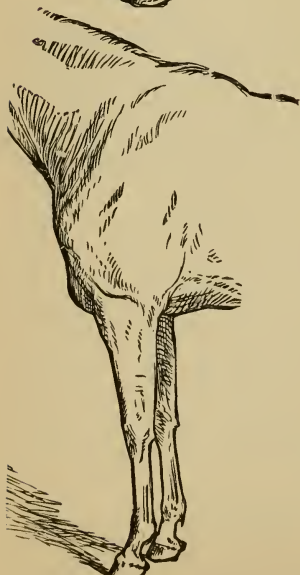
generally large and round. In the hind-legs the quarters should be large, powerful, broad when looked at in profile, and square and solid from behind.

Avoid Straight Hams.—"The hams should be sickle-shaped, not straight, and well let down, so as to bring the hocks well toward the ground. The hocks should be large and bony, straight, not angular and convexly curved in their posterior outlines; the shanks, corresponding to the cannon bones, short and flat, and the hind feet similar in form to the front. The back should be short above, from the point of the withers and shoulder-blade, which ought to run well back to the croup. The barrel should be round, and for a horse in which strength and quickness are looked to, more than great speed and stride, closely ribbed up. A horse can scarcely be too deep from the tip of his shoulder to the intersection of his fore-leg—which is called the heart place—or too wide in the chest, as room in these parts gives free play to the most important vitals. The form of the neck and setting on of the head are essential not only to the beauty of the animal, but to the facility and pleasure of riding or driving him; hence, with an ill-shaped, short, stubborn neck, or ill set on head, the animal cannot by any possibility be a pleasant-mouthed horse, or an easy one to manage.

A Clean, Strong Neck.—"The neck should be moderately long, convexly arched above from the shoulders to the crest, thin where it joins the head, and so set on that when yielding to the bit it forms a semi-circle, like a bended bow, and brings the chin downward and inward until it nearly touches the chest. Horses so made are always manageable to the hand. The converse of this neck, which is concave above and stuck out at the wind-pipe like a cock's wattle, is the worst possible form; and horses so made almost invariably throw up their heads at a pull, and the most exceptionable of brutes, *regular star-gazers*. The head should be rather small, bony, not beefy, in the jowl; broad between the eyes, and rather concave, or what is called basin-faced, than Roman-nosed, between the eyes and nostrils. The ears should be fine, small and pointed; the eyes large, clear and prominent, and the nostrils wide and well opened. A horse so framed cannot fail, if free from physical defect, constitutional disease and vice, to be a good one for any purpose—degree of strength, lightness and speed, being weighed in accordance with the purpose for which he is desired."

IX. Front View Showing Bad Fore-Quarters.

On page 98 are four figures. The upper left hand one shows a fair leg down to the knee; from that point down it is bad. The toes are turned



SIDE VIEW OF FORE-QUARTERS, SHOWING BAD CONFORMATION.
(See Explanation.)

very much out; such a horse has not due strength, and the action will be increasingly bad with age.

The figure to the right shows the reverse of the preceding. The knees are turned out, and the toes are turned in—a horse unsightly, weak and dangerous either to drive or ride.



GOOD HIND QUARTERS. (See Explanation.)

The lower left hand figure is unsightly enough. The legs sprawling, weak, straddling, with turned out toes. Some might think that such a

horse had a sure foundation to stand on ; perhaps so, if he always stood at the manger. Such horses might be tolerably sure-footed, if not hard driven, and carefully managed. They are often seen in the hands of persons who will not pay for accurate information. The good judge of horseflesh lets them severely alone.

The lower right hand figure is as bad as possible all over,—a weak-legged, knock-kneed, splay-footed brute that is unserviceable, dangerous and costly to the owner. This conformation often goes with what some call style. Horsemen term them “weeds.”

Thus we have carried the reader through a careful study of the front half of the horse. If carefully studied and the information kept fully in mind, the reader may reasonably expect to be able to buy a horse with good fore parts, from an outside view, upon his own judgment.

X. The Hinder Parts Illustrated.

The adage that if the fore-quarters of a horse are strong enough to hold him up, the hind-quarters will carry him forward, is true in a sense, since if a horse is perfect in his fore-quarters, the hind-quarters are pretty sure to be good. Yet the majority of horses if they break down at all do so first in their forward limbs, spavin being one of the principal disabilities of the hind limbs. The real facts are that the proportions of the whole animal must be harmonious, each part assisting the others while at the same time it is doing its own appropriate work. This will be more fully understood by referring to what has been said in the chapters on Anatomy, on the muscular conformation. As already stated, the hind quarters are the real propelling power of the animal. The forward motion is given by successive springs or leaps, very clearly shown when the horse is galloping. Then the fore parts act more in the nature of a balance than either . walking or trotting, or in that artificial movement, the amble or pace. In the last named the change of the center of gravity is from side to side in connection with a slight one front and rear. In walking and in trotting the change of the center of gravity is more equally distributed between the sides and forward center. In running, the change of gravity is almost entirely from front to rear.

XI. The Propelling Power.

If it is to do its work effectively, the propelling power must be provided with a large loin, strong, muscular quarters, great length of hip ; strong, dense and necessarily fine bones ; strong joints, and flat, wide legs, with sinews steel-like in their strength, and standing out like great cords. It is this great tendinous development that gives the lower limbs the flat appearance, seen in all horses of great power. The bones themselves are not flat ; the bones and tendons however combine to form a flat

leg. On page 103 is an illustration of a perfect hind-quarter, seen from the side. On page 106 are four figures showing fair to bad hind-quarters. The horseman, in studying his animal, should observe whether if, when viewed from the side, the horse stands perpendicularly on each foot alike. There should be no straddling-out, or gathering together of the limbs, but he should stand straight, square and distinctly alike on each limb. If he does not stand in this way, move him forward on level ground and observe if, in coming to rest, he assumes the position we have described; if not, something is wrong. Examine him for defects, injured back or sinews, ring-bones and splints in front; and for bonespavin, blood or bog spavin, curb or thorough-pin behind. If he stands as in the figure, page 103, showing good hind-quarters, the horse is right, if free from other blemishes. If the fore-quarters are as shown on pages 97 and 99 side and front view; and, if on looking at the horse from behind, he present the appearance as shown on page 107 you will have to hunt a long time to find his mate.

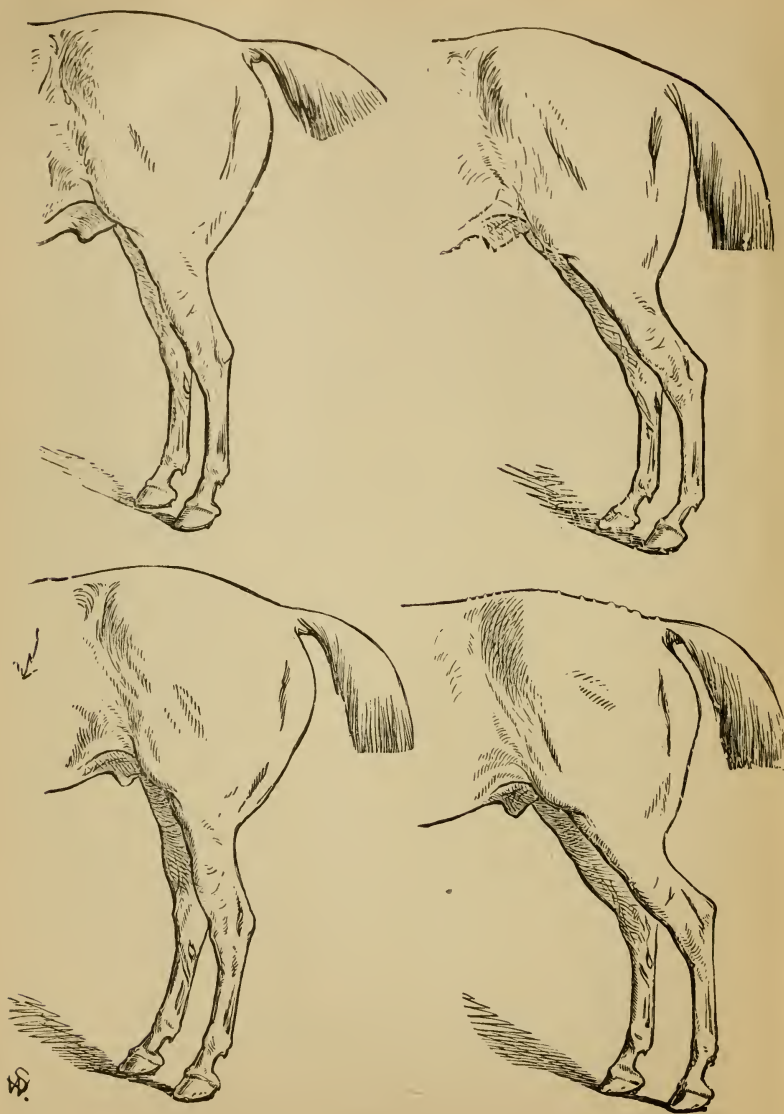
Look Well to the Limbs.—Study carefully whether the pasterns or outline of the hock joints are nearly perpendicular or angular. Examine to find if they show a convex, curved projection or protuberance just above the point of union with the shank bone. If not, there will be little danger of curb, or of a tendency thereto. Avoid a cow-hocked horse, viz: a horse with the hocks drawn in. It is an ungainly and serious malformation, for such an animal will be weak. Do not buy a straddling horse. He may be strong and perhaps fast, but never elegant in his movements. We repeat that no horse is fast because he goes wide apart, though sometimes a horse is fast in spite of this defect. Therefore do not buy a straddling colt in hopes of getting a trotter.

Medium Good to Bad Quarters.—On page 106 are four figures, side views of hind-quarters. Many persons would call the one on the upper left hand side, fine. It is not bad. The buttocks are round, for fat may give a round buttock. But they lack character, real muscular development, and the legs are too straight and far behind.

The left hand lower figure is fair in its general outline, but the animal stands too straight on the pasterns, and the legs are thrown too far forward. Never buy a horse which, to use a horseman's phrase, "can stand in a half-bushel." They are like a horse which, to use a similar phrase, "can travel all day in a half-bushel."

The right lower figure has not a bad quarter. The limbs, however, are badly placed, and the position is cramped.

The upper right hand figure is bad in every way—"goose-rumped," "cat-hammed," weak in the hock and ankle, while the legs are thrown to equalize the strain.



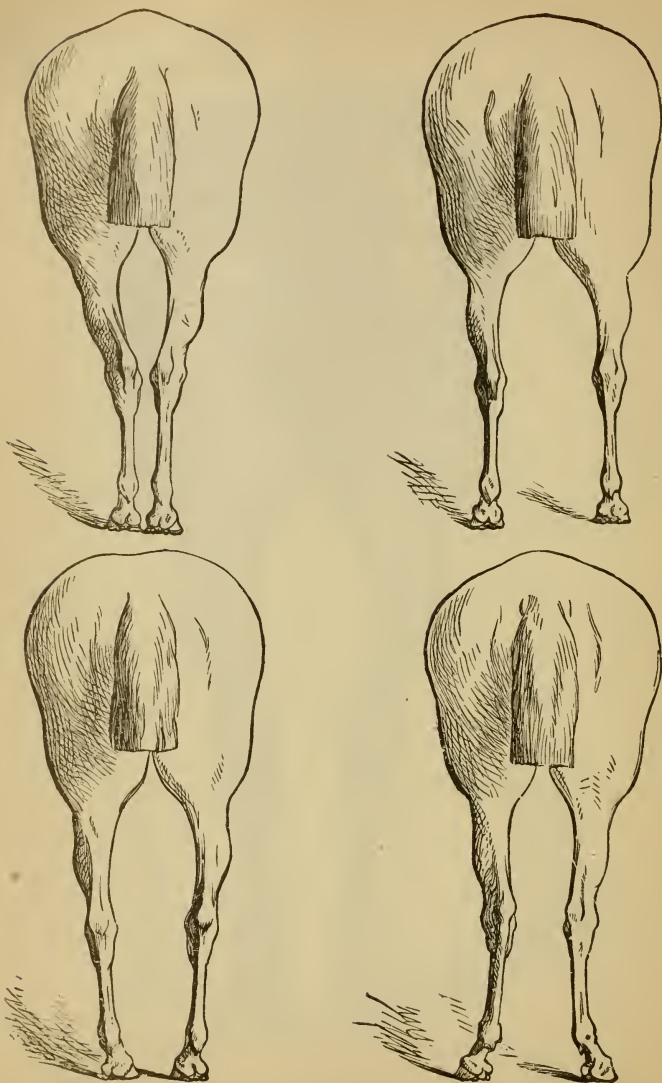
SIDE VIEW OF HIND-QUARTERS—BAD. (See Explanation.)

The Quarter from Behind.—Looking at the horse from behind, the quarters should be full and square. This will be the case if the *gracilis* are perfectly shaped. The *gracilis* are the muscles which give the pecu-



BACK VIEW OF HIND-QUARTERS—GOOD. (See Explanation.)

liar swell to the inside of the thigh, and are described in the chapter on muscular formation. The outside muscle of the great bone of the leg, (*tibia*) cannot well be too large, and the tendons, connecting with the



BACK VIEW OF BAD HIND-QUARTERS. (See Explanation.)

hock, should be large and plainly visible. The hocks should be large, strong, firm, well knit, smooth and free from blemish. The fetlocks should also be large but round and firm, and the hoofs strong. If the horse is flat-footed he is weak hoofed, and this defect should never go with a horse of strong bone and muscle.

If, in moving forward, the animal lift the feet squarely, and carry them straight forward, without turning or straddling, and if they are set down as squarely and promptly as they were picked up; if the conformation is as illustrated in the several good figures, it is a horse to buy, if you want to pay for a good one, or to keep, if you already possess him. If it be a mare do not fear to breed her to the best sires in the land. She will not disappoint you in her colts, if the sire be as perfect.

As the converse of this we refer the reader to the figures on page 108, showing the gradations, from inferior to bad. The study of these figures should enable one to avoid cow-hocked, pigeon-toed, bow-legged, straddling, or splay-footed brutes.

XII. What the Ancients Knew of Horses.

That the ancients were critical judges of horses, there is no doubt; and that their standard was not far below that of to-day, the following extract from a translation from Xenophon, who wrote more than two thousand years ago, will show. It is also interesting by reason of the accurate advice it gives for judging a horse. The perfect horse of this ancient Greek writer was not a thoroughbred, as we understand the term, but he was a good, strong, well-muscled, enduring horse, and one of fair size. Here is what Xenophon says:

“We will write how one may be the least deceived in the purchase of horses. It is evident, then, that of the unbroken colt one must judge by the construction, since, if he have never been backed he will afford no very clear evidences of his spirit. Of his body, then, we say it is necessary first to examine the feet, for, as in a house, it matters not how fine may be the superstructure, if there be not sufficient foundations, so in a war horse there is no utility, no, not if he have all other points perfect but be badly footed. But in examining the feet, it is befitting first to look to the horny portion of the hoofs, for those horses which have the horn thick are far superior in their feet to those which have it thin. Nor will it be well if one fail next to observe whether the hoofs be upright, both before and behind, or low and flat to the ground; for high noofs keep the frog at a distance from the earth, while the flat tread with equal pressure on the soft and hard parts of the foot, as is the case with bandy-legged men. And Simon justly observes that well-footed horses can be known by their tramp, for the hollow hoof rings like a cymbal

when it strikes the solid earth. But having begun from below, let us ascend to the other parts of the body. It is needful, then, that the parts above the hoofs and below the fetlocks (pasterns) be not too erect, like those of the goat; for legs of this kind, being stiff and inflexible, are apt to jar the rider, and are more liable to inflammation. The bones must not, however, be too low and springy, for in that case the fetlocks are liable to be abraded and wounded if the horse be galloped over clods or stones. The bones of the shank (cannon bones) should be thick, for these are the columns which support the body; but they should not have the veins and flesh thick likewise. For if they have, when the horse shall be galloped over difficult ground they will necessarily be filled with blood, and will become varicose, so that the shanks will be thickened, and the skin be distended and relaxed from the bone; and, when this is the case, it often follows that the back sinew gives way and renders the horse lame. But if the horse, when in action, bends his knees flexibly at a walk, you may judge that he will have his legs flexible when in full career; for all horses as they increase in years increase in the flexibility of the knee. And flexible goers are esteemed highly, and with justice, for such horses are much less liable to blunder or stumble than those which have rigid, unbending joints. But if the arms, below the shoulder-blades, be thick and muscular they appear stronger and handsomer, as is the case also with a man. The breast also should be broad, as well for beauty as strength, and because it causes a handsomer action of the fore legs, which do not then interfere, but are carried well apart.

“Again, the neck ought not to be set on like that of a boar, horizontally from the chest; but, like that of a game cock, should be upright toward the chest and slack toward the flexure; and the head being long should have a small and narrow jaw-bone, so that the neck shall be in front of the rider, and that the eye shall look down at what is before the feet. A horse thus made will be the least likely to run violently away, even if he be very high-spirited, for horses do not attempt to run away by bringing in, but by throwing out their heads and necks. It is also very necessary to observe whether the mouth be fine and hard on both sides, or on one or the other. For horses which have not both jaws equally sensitive are likely to be too hard-mouthed on one side or the other. And it is better that a horse should have prominent than hollow eyes, for such an one will see to a greater distance. And widely opened nostrils are far better for respiration than narrow, and they give the horse a fiercer aspect; for when one stallion is enraged against another, or if he become angry while being ridden, he expands his nostrils to their full width. And the loftier the crest, and the smaller the ears, the

more horse-like and handsome is the head rendered; while lofty withers give the rider a surer seat, and produce a firmer adhesion between the body and shoulders.

“A double loin is also softer to sit upon and pleasanter to look upon than if it be single; and a deep side, rounded toward the belly, renders the horse easier to sit, and stronger and more easy to keep in condition; and the shorter and broader the loin, the more easily will the horse raise his fore-quarters and collect his hind-quarters under him in going. These points, moreover, cause the belly to appear the smaller; which, if it be large, at once injures the appearance of the animal and renders him weaker and less manageable. The quarters should be broad and fleshy in order to correspond with the sides and chest, and, should they be entirely firm and solid, they would be the lighter in the gallop, and the horse would be the speedier. But if he should have his buttocks separated under the tail by a broad line, with a wider space between them, by so doing he will have a prouder and stronger gait and action, and will, in all respects, be the better on them. A proof of which is to be had in men, who, when they desire to raise anything from the ground, attempt it by straddling their legs, not by bringing them close together.”

XIII. What One Need Not Expect.

We have, in the foregoing chapters and in this, illustrated and explained the several parts of the horse and his excellences so fully that none need go astray in studying the points of an animal. If these illustrations and explanations are borne in mind, a horse may be accurately judged by his actual bone and muscle, whether fat or lean. The intelligence of an animal may also, by the same study, be accurately estimated. A fat horse is generally smooth and round, and many a sorry brute has been fattened for the purpose of palming him off on the unwary.

We need not expect a fat horse to go right to work, and keep fat. The horse for hard work must first be brought into condition, and this means working off the mere fat, and getting down to bone and muscle. We must not expect a horse to be useful because he is big, unless he is wanted for heavy draft. If the draft is heavy it should be slow, and thus the horse may be big and also keep fat. For general work, the medium-sized horse is the best. A pair of horses, each 16 hands high and weighing 1,200 pounds are well suited for city teaming and other ordinary draft, except the hauling of heavy trucks. A fifteen-and-a-half hand, 1,100-pound horse is suitable for the road, and if one-half hand less in height and correspondingly light in weight, say 1,000 pounds, he will do quite as well in single or double harness. Sixteen-hand horses are also suitable for coaches and heavy carriages, while the lighter animals will

serve as double teams for road driving. If they are good ones, free from vice, well-matched, and perfectly trained, do not be afraid to ask a good round price for them. But do not expect to get a large price for a cheap horse, nor need you expect to buy a perfect horse for a low price. He



FORREST SQUIREL.

may, nowever, be cheap at any price your purse may afford. In buying, keep constantly in view what you want the animal for, but do not buy any horse because he happens to strike your uneducated fancy. You certainly will not do so, if you have carefully studied the preceding chapters.

CHAPTER V.

THE HORSE'S TEETH; AND HOW TO TELL HIS AGE.

I. THE DENTAL FORMULA.—II. THE TEETH ARE THE TRUE INDEX OF AGE.—III. THE FOAL'S TEETH.—IV. DIFFERENCES BETWEEN THE TEETH OF FOAL AND HORSE.—V. ALLOWANCES TO BE MADE.—VI. ILLUSTRATING BY THE CHART.

I. The Dental Formula.

The names and numbers of the teeth of the horse are as follows: *Incisors* (front teeth or nippers) $\frac{8}{8}$; *canine*, or tushes or hook teeth, in the male only, $\frac{1}{1}$; *molars*, or grinding teeth $\frac{20}{20}$, making forty in all. This is for the male. The mare has but thirty-six, since she lacks the tushes, or canine teeth. These sometimes also fail to develop in the gelding.

II. The Teeth are the True Index of Age.

Almost every horseman is supposed to be able pretty accurately to determine the age of his horse. Among old horses, the eyes, the sharpness of the jaw bones, and the bones of the tail, are, by many, claimed to give a clear indication of the animal's age. But these are all fallacious. They may be, and in fact are, helps, but the only true indication is given by the teeth; and to the educated eye, these are sufficient to tell the age accurately up to eight years, and thereafter with sufficient accuracy for all practical purposes. From the time the colt is foaled until death, the teeth are constantly undergoing change. Hence, if a person carefully studies the changing conditions of the teeth, he may accurately determine the age either of the colt or horse. The incisors furnish the chief indication, but to some extent the tushes or hook teeth, and the grinders give valuable assistance, since they may correct, or corroborate, what is seen in the incisors. To assist in this study we give in this chapter, a chart showing, from accurate drawings, the precise appearance of the teeth from colt-hood up to the age of twenty-nine years. This chart, with the accompanying explanations, will enable any person of intelligence to judge the age of a horse, even though he have been "Bishoped," as the making of false marks on the teeth is called, from the name of the rascal who invented the practice.

III. The Foal's Teeth.

When just foaled, the colt has no front teeth, but in most cases twelve back teeth appear just above the gums. At from two to three months of age four central nippers appear, two in each jaw; in six weeks another tooth comes out on each side of these, or four more all together; and

at the age of eight or nine months the four corner nippers are seen. At this age the colt has all his teeth, upper and lower. They are the foal's teeth and are changed by the fifth or sixth year for the permanent or horse's teeth. As before stated, the three front double pairs of grinders are seen at birth, and are afterwards changed. The fourth double pair, those seen from the eighth to the ninth month, are the first that remain stationary, and are found in the mouth of every year-old colt. The fifth double pair (fifth four), appear in the second year, while the sixth double pair generally come in the fourth or early in the fifth year. These three double pairs of back teeth remain unchanged, as also do the tushes or hook teeth. The tushes do not appear at a fixed age; sometimes they are seen in the stallion at the end of the third year, and sometimes not until the middle or the end of the fourth year; sometimes they do not come until the fifth year, and occasionally not until the sixth year. The mare never has them, and in the gelding they occasionally fail to develop.

IV. Differences Between the Teeth of Foal and Horse.

The difference between the nippers of the foal and those of the horse should be carefully studied. They differ, (1) by their regular conical formation; (2) by a narrow contraction called the neck, visible almost in the center of the body of each tooth, while nothing of the kind is seen in horse-teeth; (3) by their smaller size, even when full grown. The milk teeth (those teeth which are shed), taken from the jaws of dead foals and compared with horse-teeth similarly obtained, are found to be only about half as long as the latter. The breadth is not to be depended on, since the milk teeth of large foals appear almost as broad as those of small horses. When the nippers become horse-teeth they form a great contrast to the middle and corner teeth. The size of these last will at once show them to be milk teeth. (4) The outer surface of the foal-teeth is smooth and striped with brown, while on horse-teeth the same surface is divided by a dirty yellow indentation inclining toward the center, which is sometimes double upon the upper teeth.

A study of the nippers of the horse taken at different ages will materially assist the beginner. The incisor and all other teeth, consist, first of the enamel or biting or grinding surface; then of a bony substance, and lastly of the root imbedded in the jaw. The teeth of the foal as well as of the horse, are constantly but slowly worn away in the act of feeding. If the animal feed on sandy or gritty, and especially on short pasture, the teeth are worn faster; if he feed on longer grass, and on the prairies the teeth wear slowly. Horses kept in the stable, have less wear on the nippers than those which have to forage for themselves. Thus in old age the teeth, once two and a half or three inches long, will

finally be not more than half an inch in length, and the breadth decreases in about the same proportion. There is this difference, however, between the teeth of the foal and those of the horse. The thickness and breadth of the foal's teeth are constantly decreasing from the grinding surface or enameled part toward the root, while the teeth of the horse decrease by contraction. The grinding surface of a nipper, which has not been used, is three times as broad as it is thick, and is hollowed from the top downward, the hollow having two sharp edges inclosing it. This hollow is called the mark. In the center of this mark the kernel is seen. This is a tube commencing at the end of the root, and contains the nerve, which must not be confounded with the mark. The mark is the outer depression, lying next to the sharp edges. The inner cavity is a funnel shaped socket of enamel, a hard shell. Around this, and inside the outer shell, is a thick fluid, which remains as long as the tooth retains sensibility, but becomes by degrees a gray matter. Figure 8, on the chart, will illustrate this.

Again, the outer edge of an incisor (nipper) always rises a line or two—a line is the twelfth part of an inch—above the inner edge. Thus, at first, only the outer edges of the upper and lower nippers meet, and the inner edges do not touch until the outer edges are sufficiently worn to allow them to meet, or until they are of an equal height. Horse-teeth reach this condition in about a year. When the colt is two-and-a-half years old, the teeth begin to shed, and the permanent or horse-teeth begin to appear. The chart, Fig. 7, A, will explain this growth, and Fig. 7, B, will show still further development and wear.

The grinders have but little to do in determining the age of a horse, but still they assist thereto. The crowns of the grinders are entirely covered with enamel on the top and sides, but the grinding of the food wears it away from the top and there remains a compound surface of alternate layers of crusted enamel and ivory, which serve, in grinding the food, to fit it for the stomach. Nature has therefore made an additional provision to render them strong and enduring.



To illustrate this we represent a grinder sawed across. The fine dark spots show bony matter. The shaded portions show the enamel, while the white spaces represent a strong bony cement uniting the other parts of the teeth. In the dental formula at the beginning of this chapter we have given 40 as the number of teeth for the stallion, and 36 for the mare, the stallion having 4 hook teeth, or tushes (*canines*),

which the mare lacks. Sometimes, however, the mare has imperfect teeth in the portion of the mouth corresponding to that of the tushes in

the stallion. Twenty-four of the teeth in both horses and mares are situated in the upper part of the mouth, that is back of the tushes, or above the lips. These are the true teeth or grinders (*molars*). They are divided into six double pairs, counting from below upwards. Those situated next the nippers of a mare, or the tushes of a horse, and in all the four rows, are called, first; those next, second, and so on until the last double pair are reached, which are called back teeth. There are also sometimes in young horses imperfect teeth, just before the grinders, ignorantly denominated wolf-teeth, and are supposed to cause blindness. They sometimes do produce irritation of the eyes, from inflammation by sympathy, and should be removed with the forceps.

In the lower portion of the mouth, or that portion surrounded by the lips, there are twelve teeth, six in the upper jaw and six in the lower jaw. These are the nippers (*incisors*). They occupy the entrance to the mouth, and each six are in the form of an arch. These teeth are divided into three pairs in each jaw. The four central ones, two in each jaw, are called "nipping teeth," or nippers. The two outside teeth in each jaw are "corner teeth," and those between the corner teeth and the nippers are called middle teeth. It is the attrition of the upper surface of these teeth on each other in eating that causes wear, and thus enables us to judge with tolerable accuracy of the age of the horse,—usually to a certainty up to eight or nine years; quite closely up to fourteen or fifteen years, and approximately up to the age of twenty-five or thirty years. The nippers (*incisors*) of the upper jaw are broader and thicker than those of the lower jaw.

The tushes (*canines*) are placed singly, one in each side of the upper and lower jaws, between the corner teeth and the grinders, but nearer the corner teeth of the upper than of the lower jaw, so that they never come in contact with each other. The age at which a horse attains the full number of teeth is from four-and-a-half to five years. He is then, in horseman's phrase, said to have a "full mouth." From this time onward the more a permanent incisor loses in length by wear, the more it loses in width, and the nearer the worn surface approaches the root, becoming narrower and thicker in appearance. Another fact is worth remembering; as the horse advances in age the gums recede, so that a smaller portion of the teeth is covered. Hence the reason that the teeth become narrower and thicker with age. It is from being uncovered; and hence again, aged teeth are longer in their visible portions than those of younger horses.

V. Allowances to be Made.

Large horses have larger teeth than small ones. The rules given are for horses of medium size. Some horses have harder bones than others,

and harder teeth. The difference in food and in pastures has already been spoken of. Some breeds of horses develop more slowly than others. Spanish horses develop slowly. Again, a false system of feeding will mature an animal sooner than if he were fed in the ordinary way. But animals which develop slowly generally live longer than those which develop quickly, so that in the end, the years of service, judging from the teeth, are about the same. The slowly-developed horse is, however, older by perhaps one or two years than would appear from his teeth. In like manner, the age of a mule is difficult to determine with exactness, though it may be determined closely enough; and a mule of twelve or fifteen years of age, if he has not been injured, has many years of service yet in him.

VI. Study The Chart.

Nine men in ten, in examining the teeth to ascertain the age, will look at the upper jaw. The lower jaw is really that which should be examined, and for this reason, the dealer or person who wishes to deceive usually confines his operations to tampering with the incisors of the lower jaw. Again, the teeth of the lower jaw show wear, and change their appearance more surely than those of the upper jaw. Hence in studying the teeth for age, both jaws should be looked at, and thus a careful study of the chart will be of the first importance. In relation to this matter, Youatt says: "Stabled horses have the mark sooner worn out than those at grass, and a crib-biter may deceive the best judge by one or two years." While it is true, that a horse kept on dry hay and dry grain, will do so, it is a fact well known that horses feeding on gritty pastures, or sandy pastures, where they are obliged to bite close to the ground, will wear their teeth very much faster than others. It should not be difficult, either, to detect a confirmed crib-biter. The teeth will not only be worn from grasping the object in the act, but the edges also are apt to be broken or scaled, from the slipping off of the teeth in the act of letting go.

In relation to tampering with the teeth, by filing, burning, etc., it ought not to deceive any one. Upon this subject, Youatt says: "Dis-honest dealers have been said to resort to a method of prolonging the mark in the lower nippers. It is called *bishoping*, from the name of the scoundrel who invented it. The horse of eight or nine years old is thrown, and with an engraver's tool, a hole is dug in the now almost plain surface of the corner teeth, and in shape and depth resembling the mark in a seven year old horse. The mark is then burned with a heated iron, and a permanent black stain is left; the next pair of nippers are sometimes lightly touched. An ignorant man would very easily be imposed

on by this trick ; but the irregular appearance of the cavity, the diffusion of the black stain around the tushes, the sharpened edges or concave inner surface of which, can never be given again, and the marks on the upper nippers, together with the general conformation of the horse, can never deceive the careful examiner."

Thus we see how necessary it is that more than a superficial examination be given, and for this reason, we advise a careful study of the chart. As the horse becomes aged, or after eight years of age, the lower jaw is the sure index, since the marks there naturally wear faster than in the upper nippers. The lower jaw is the one that is moved in gathering food and in grinding it, and hence the greater wear ; besides this, cavities in teeth of the upper jaw are greater than in those of the lower jaw ; hence the wear must be greater to obliterate the mark. In fact, the person who aspires to be a critical judge, must examine the teeth of horses kept on hay and hard grain, those fed on cut feed, and those from various pastures. Yet, except this critical knowledge is required, a study of the chart will answer for all purposes.

In the horse, the incisors are divided into three pairs in each jaw, being the twelve front teeth. The first pair, above and below are the two central front teeth. The next two teeth on each side in each jaw are called the middle teeth, and the two outside teeth in each jaw, are the corner teeth.

The canines are called hooked teeth, from their form, and sometimes tushes. They are two in each jaw, lying between the incisors and grinders. The grinders are the double or back teeth of the jaw, but the term grinder is used to denote the rough surface of the cutting teeth, and the mark is the depression in the surface of the teeth.

Another thing that should be noticed, is, that the teeth are regular, for irregular teeth, that is teeth some of which are longer than others, will wear unevenly. Thus allowances must be made here, when it is necessary to determine the age exactly. Again, the general rule is to estimate the age from May 1st of each year. Thus, a colt born on the first day of January would be called only one year old on May 1st of the next year, when, in reality, he would be sixteen months old. This is taken advantage of in racing, and hence foals are desired to be born as near to the first of January as possible. But if born in December, the racing colt would count as one year old the succeeding May. Yet practically, this makes no difference to the farmer, but only to those who rear horses for the turf.



FRENCH COACH HORSE.
Specially photographed for this work.

CHAPTER VI.

BREEDS OF HORSES AND THEIR CHARACTERISTICS.

.. INFLUENCE OF COUNTRY AND CLIMATE.—II. THE FARM HORSE.—III. THE CLYDESDALE HORSE.—IV. THE NORMAN-PERCHERON.—V. THE PERCHERON OF TO-DAY.—VI. THE CONESTOGA HORSE.—VII. ROAD HORSES.—VIII. TROTTING HORSES.—IX. HUNTING HORSES.—X. LIGHT DRIVING HORSES.—XI. COACH HORSES.—XII. THE CLEVELAND BAY.—XIII. THE FRENCH COACH HORSE.—XIV. THE HACKNEY HORSE.—XV. PONIES.—XVI. VERMONT DRAFT HORSE.—XVII. NARAGANSETT PACER.—XVIII. THE SHIRE.—XIX. THE BELGIAN HORSE.—XX. CHARACTERISTICS OF THE BELGIAN HORSE.

I. Influences of Country and Climate.

Every country of the earth has a breed or breeds of horses, each with its peculiar characteristics; and the horses of Asia, Africa, Europe and America have their points of difference as strongly marked as do the human inhabitants of these grand divisions of the globe. Besides the peculiarities resulting from local influences of climate, topography, etc., the horse has others which are due to the treatment and training received at the hands of his masters, since from a long course of artificial breeding and feeding, he has become a purely artificial animal, except among barbarians or savage tribes. Among savages, his hard environment has made him degenerate—has in fact reduced him to a condition inferior to that of the horses found running wild where they have increased and multiplied on pasturable lands, after having escaped from domestication. The horse in the latter condition has already been sufficiently mentioned in the first chapter. In the present chapter we purpose to notice only the more important breeds of civilization, or those that have acquired celebrity for their valuable qualities.

II. The Farm Horse.

The farm horse is the most important member of the equine family, for the reason that he is used by the largest number of people, and is employed in the production of that which sustains life in man. The farm horse cannot lay claim to the dignity of a distinct breed, as he is composed of mixed blood, and is dependent for whatever valuable qualities he possesses, upon the intelligence of the people by whom he is bred. The majority of farm horses are inferior to the more respectable of the fixed breeds, though of late years they have steadily increased in valuable qualities, through the introduction of superior blood; and in many districts they are, as they should be, bred with reference to their sale for particular uses, after they have partially paid for their care by their labor on the farm.

The Horse of All Work.—The farm horse should essentially be a horse of all work, of good style and action, and of about 1200 pounds weight.



IMPORTED DRAFT HORSES.

Such horses will be able to do anything that may be necessary to be done about the farm, plowing, reaping, hauling, or drawing the family carriage to church. When of suitable age they will bring good prices, the

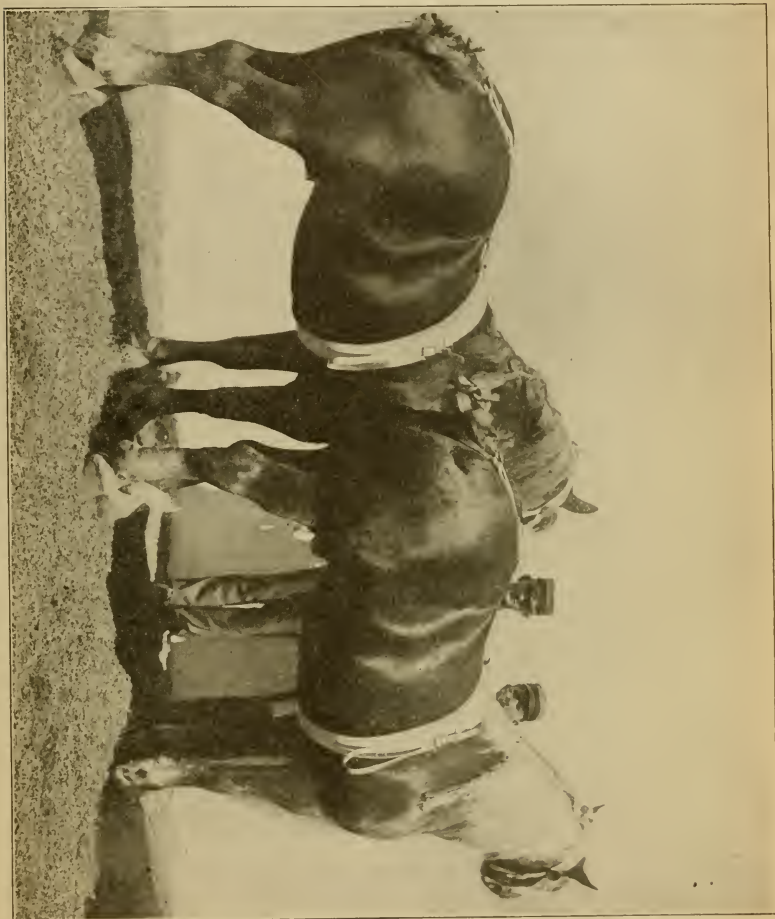


SUFFOLK STALLION, HIS GRACE.

best of them for use as carriage horses, and others for anything except heavy draft in cities, for express work, drawing omnibuses and other labor, requiring style and action, combined with strength. The figure

page 99 front view, and page 103 side view, and page 107 back view of hind quarters will illustrate our meaning.

Light Farm Horses.—There is another horse that may well find a place on all large farms, a horse about fifteen hands high and weighing



IMPORTED BELGIAN STALLIONS.
Specially photographed for this work.

from 950 to 1050 pounds. Such a horse as this is called, in England, a cob, a square-built, active animal, good for the saddle and all light work. Such a horse is represented on the preceding page. The tail, however, should never be docked : for docking is a barbarous practice, and one now

happily gone out of fashion. The Morgans, or rather their crosses, when bred up to the weight last mentioned, make admirable horses of this class.

The Gold Dust Horses of Kentucky.—The Gold Dust Horses, which were originated by breeding from Morgan stallions on good thorough-bred mares, and carefully selecting for generations, make admirable light farm horses. High-strung, elegant, fast-going, staunch, and able for all light work on the farm, either for the saddle or harness, as light driving buggy horses in single harness, or for the light carriage in double harness, they are most excellent animals.

III. The Clydesdale Horse.

Another class of horses that may be made profitable on the breeding farm are what are known as draft horses proper. In the United States, the best representatives of this class are the Clydesdales and the Norman-Percherons. The Clydesdales are an English-Scotch breed of great power, bone and substance, and are capable of drawing immense loads. In Canada there are many excellent representatives of this breed, and in the West they are attracting more and more attention every year. The West of Scotland has long been famous for its excellent draft horses. Their origin is probably due in part to the blood of Flemish mares, though but little is authentically known of their ancestry. Whatever their origin may be, it is certain that they have made Scotland famous for its draft-horse stock, and much of the excellence of the draft horses of the North of England, where the Clydesdale originated, is due to an infusion of this Scottish blood. In England these heavy horses are useful to farmers in working their tough clay soils. In the United States, especially in the West and South, the alluvial nature of the soil does not require such strength of team in plowing; but the vast amount of hauling to be done in and near cities, where the railroad and steamer traffic of the country centres, will always cause a demand for large, able-bodied draft horses.

The Shire horse seems to have taken the place of the Suffolk horse in England, so we have seen them in the United States. They are a larger horse than the Clydesdale, more upstanding with, perhaps, better hoofs. The hairy lower limbs, like the Clydesdale, is against them, in the eyes of the American farmer. Like the Clydesdale, they are magnificent draft animals, strong, true and honest, but we do not think they stand hard city pavements much better than the Clydes. The back and body is more symmetrical, in our view, than that of the Clyde. Like the Clyde, their



SHIRE FILLEY. "MISS CONSTANCE."

walk and trot is majestic but slow, and they are not better suited to Western agricultural soils. When first introduced into Canada and the United States, both the Clydes and Shires attracted great attention until the Percherons and heavy Normans were introduced. The style, endurance, quicker action and muscular effort was superior, in the eye of the Western man; hence, the Norman and Percheron became the favorites, and they have gained, rather than lost, ever since. This the show rings at our great fairs continue to show. Nevertheless, the Clyde and Shire continue the favorites among many breeders and farmers. For export to Great Britain, they are in request.

IV. The Norman-Percheron Horse.

Norman-Percheron horses are now generally divided into two classes: the Norman, a heavy, muscular, closely-built animal of great bone and muscle, weighing sometimes 2,200 to 2,300 pounds, and the Percheron, a lighter, cleaner built and more active animal, attaining a weight up to 1,800 pounds. Both these strains of Norman blood are among the best of draft stock ever introduced into America. They are superior in some respects to the famous Conestoga horse of Pennsylvania, now practically extinct. Much has been written about these excellent animals, both by partisans and by those who have investigated their history with a view to arrive at the real facts in relation to their ancestry. On the one hand it is contended that they arose from a cross of the Arabian upon the heavy native horses of Normandy; and the defeat of the Saracens by Charles Martel, in which great numbers of their admirable cavalry horses fell into the hands of the French, is cited in support of this view. Many of these Saracen horses, it is said, were brought to Normandy and to La Perche, and hence the commingling of blood which resulted in the present admirable breed. The old Norman war horses were heavy, bony, slow, but strong, and capable of enduring much hardship. They were admirably adapted for their day, since they were capable of carrying a knight in his heavy armor.

Again, it is asserted that the Norman horse is descended from a race then peculiar to Brittany, and used for draft, rather than for war. Another writer asserts that the Percheron is descended from a remote cross between the Andalusian, mixed with the Morocco barb, and again crossed upon the Norman, because, it is said, the Norman was too slow, and the Andalusian too light, for a knight in full armor. The old Norman horses are said to have transmitted to the race their great bone and muscle, while the Arab, or Andalusian, or whatever the cross may have been,

added spirit, action, speed and bottom. Whatever may be the facts as to their origin, both the sub-families of the Norman-Percheron combine



PRIZE WINNING PERCHERON MARE—SIX YEARS OLD.
Specially photographed for this work.

the strength of the old Norman barb with something of the speed of the Arabian, and are capable of carrying great weights and of drawing heavy

loads at a fair rate of speed. A pair of the lighter Perche horses (called in France Diligence horses, from their use in drawing the coaches of this name) are capable of going at a speed of seven or eight miles an hour.

These horses may now be regarded as having become a fixed race, capable of reproducing itself perfectly, unchanged, and without deterioration through generations, when pure sires are bred to pure dams. Bred to inferior mares, the stallion marks his impress wonderfully upon the progeny, and the pure mares also transmit their characteristics in the same wonderful manner.

V. The Percheron of To-Day.

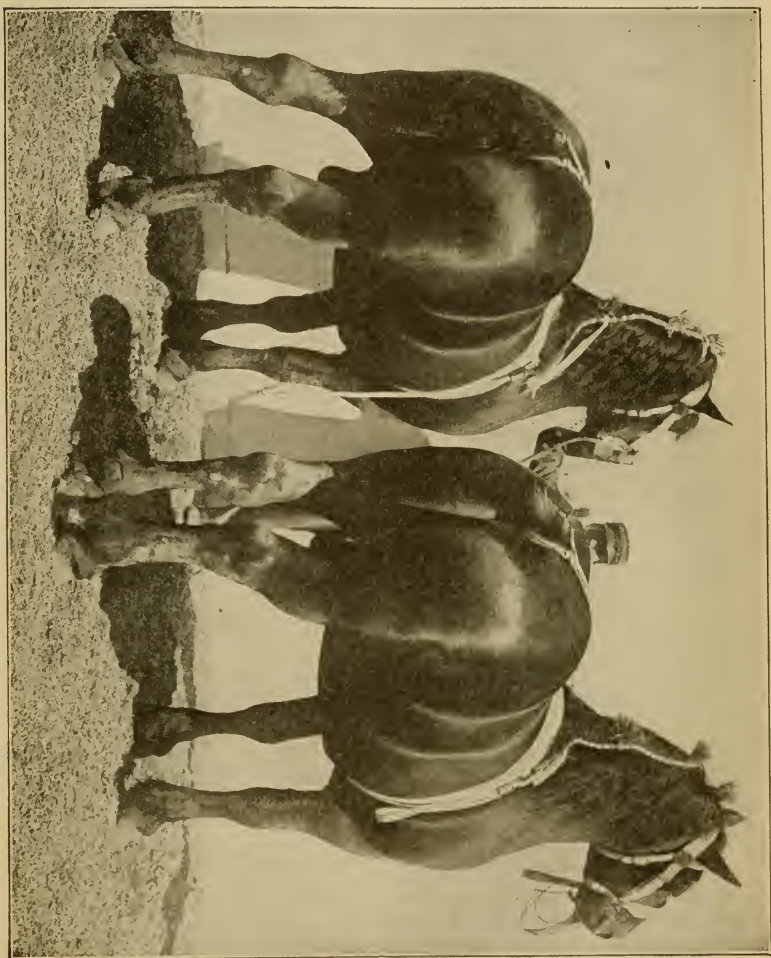
The Percheron makes a capital cross upon any of the large, roomy mares of this country. When the Percheron is bred to this kind of dams, the progeny will possess great size, and will partake essentially of the qualities of the sire. If this progeny is again bred to a pure sire, the result is a three-quarters-bred horse that is but little inferior to the Percheron in all that constitutes power and capability for work.

The Percheron is not what would be called a fast horse. He is not suited for pleasure driving, and yet he is capable of making long journeys at a speed fully equal to that of horses of more pretensions to speed. An instance is given where 58 miles out and 58 miles back was accomplished by a Percheron horse, in two days, the traveling time out being four hours and two minutes, while in returning the time was four hours, one minute and a half; and this without being urged with the whip. Again, a horse of this breed was driven 55 3-5 miles over a hilly and difficult road in four hours and twenty-four minutes, without distress to the animal.

In outward appearance the Percheron presents a head that is not long, with broad brow and slightly dished face, showing intelligence, in which respect he resembles the Arabian. The neck is of fair length, strong, muscular and well-arched, but, like the head, well proportioned to the close-ribbed, round-barreled, short-backed body. The hind-quarters and shoulders are muscular, the lower part of the leg short, hairy and possessing immense tendons. The hoofs are hard, sound, free from disease; but the Percheron is somewhat inclined to be flat-footed. The height is from fifteen to sixteen hands, though many excellent specimens of the breed are somewhat under fifteen hands, especially the lighter Percheron proper. The same description will apply to the Norman proper, except that he is larger and somewhat coarser. Their general color is gray, running from iron-gray to the handsomest dappled gray.

So difficult is it to draw the dividing line between the Norman and the Percheron, that the editor of the Percheron-Norman stud book seemed undecided just what, and what not, to admit into the stud book. Hence

the plan was adopted of giving a full account of the breeding, and crosses, so far as obtainable, and admitting to registry all stallions and mares im-



IMPORTED BELGIAN STALLIONS CARNOT AND TEAIPISTE.—Specially photographed for this work.

ported from France as Percheron, Norman, Percheron-Norman, or Norman-Percheron.

VI. The Conestoga Horse.

It is unfortunate that the Conestoga, one of the very best of American horses for draft, for all work in fact on the road or on the farm, should have been allowed to become extinct. Strong and able in every respect, a handsome, quick-stepping animal, and as honest as an ox at a dead pull, the Conestoga horse possessed qualities which entitled his breed to perpetuation. His original home was the Conestoga Valley, of Pennsylvania, and hence the name. This valley was originally settled by Germans, who undoubtedly brought with them the heavy German and Danish horses of their native land. Under the ample feed and genial climate of the Conestoga Valley, these foreign horses were, by careful selection, and an occasional dash of the staunch thorough blood of those days, developed into a race of horses ranging from sixteen to seventeen hands in height, weighing from 1250 to 1500 pounds, and proving to be among the most valuable horses ever known for drawing great loads over hill and mountain. A cross of the Cleveland Bay upon large, round-barrelled, roomy mares might again result in something like this horse. The experiment would be well worth the trial by breeders, who have the will and the years before them to originate a breed of horses, that would be capable of doing any work, from deep plowing, to wagoning and heavy carriage work. Though the Conestoga is no longer bred in purity, there are yet many mares in Pennsylvania descended from this stock, which if crossed with the Cleveland Bay, as we have known him, would, the breed being carefully preserved in, produce a stock of horses possessing most of the valuable qualities of the Conestoga. There are many such horses, in the pastures of Ohio and Pennsylvania. They are high headed, rather long in the limbs, not quite good in the barrel; but, if bred as we have described the outcome would be most satisfactory. The Cleveland Bay is not really a draft animal, but is most excellent as a horse of all work, and will be described further on.

VII. Road Horses.

Many persons get their ideas of what a carriage horse, and especially a driving horse, should be, from English books, and from travelers who have visited that country. So far as action for show, in harness and the saddle, are concerned, they are admirable models, omitting their docked tails, which, are happily going out of fashion there; and which, in this country of generally dry roads and stinging insects, are not to be tolerated at all. The model English roadster is a horse in high condition for service, not overloaded with fat, but in a condition of muscular strength and ability that would be difficult to better. A horse for similar road service should be 15 to 15 1-2 hands high, of good style, and well-muscled throughout. If he be half to three-quarters bred from accepted

trotting families, so much the better. In fact, in the United States, as has for many years been the rule in England, the road horses of the better class, are strongly imbued with thorough blood. Such were the Morgans, and such are the Gold Dusts, while many gentlemen's driving horses now-a-days are closely bred to the blood of Hambletonian, Bell-founder, Abdallah and other famous getters of horses for the trotting course. In another part of this work will be found portraits of the American type of trotting horses, among them Goldsmith's Maid, and the highly-bred roadsters. The road horse should not only be a horse of good substance in bone and muscle, but he should also be an animal of fine style, a quality which is not always found in the trotting horse of the race course. If he can go fast and safely with high action, it is better; but style he should have, and his temper must be without fault. His head must be light and held well up, the limbs strong and clean, the shoulders and pasterns oblique, and having that springy, nervous action characteristic only of high breeding.

VIII. Trotting Horses.

"The trotting horse" of the turf has appropriated the name because he is *par excellence* the fleetest and most highly-valued of trotters. The road horse, though having the same gait, falls short of being a "trotting horse," only in that he cannot make speed with the wheel-and-harness kings of the turf. If a trotter have great speed the lack of style in him is overlooked. If he is stylish and fast enough for fine driving he will bring a good price as a roadster, even though he do not possess great speed. A trotter which lacks both style and speed degenerates into a mere hack.

IX. Hunting Horses.

Another valuable class of horses, especially in the South, are what would be denominated in England, light hunting horses. The light hunting horse must be well-bred, able to gallop at speed, and to leap ordinary obstacles, as hedges, ditches and fences; in this country he should be taught to swim easily and take to the water promptly, especially when deer is the game hunted. Thoroughbreds, that are not fast enough for the turf, make capital hunting horses, for foxes, and, in open, smooth country, for deer and prairie wolves; but they are not capable of carrying heavy weights in a rough country, or over serious obstacles, and under such conditions necessarily soon come to grief. No matter what may be the blood of a horse, if he do not take kindly to the water and to leaping, he would be dangerous in the extreme to ride to hounds, or at least would soon fall behind the chase, which is but little less mortifying to the true huntsman than to be landed in a ditch. The hunter of to-day

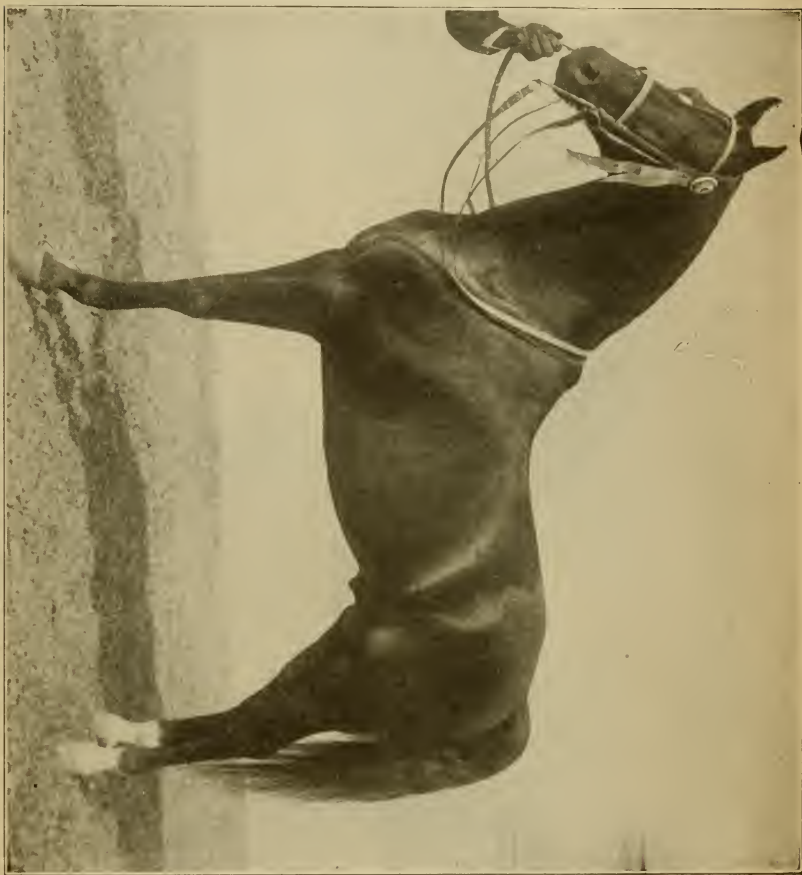
is far better-bred and lighter than those which men now in middle age rode in youth, though a three-quarters-bred horse, of the Monmouth-Eclipse blood, upon which as a boy we followed the chase in Illinois, up



TWO-YEAR-OLD MORGAN FILLY.
Specially photographed for this work.

to thirty years ago, was well-enough bred for to-day. He was a large, slashing horse, that never refused a Virginia fence, ditch or water,—there were no hedges in the West in those days—and never brought the rider to grief, though sometimes disaster seemed near enough as we went

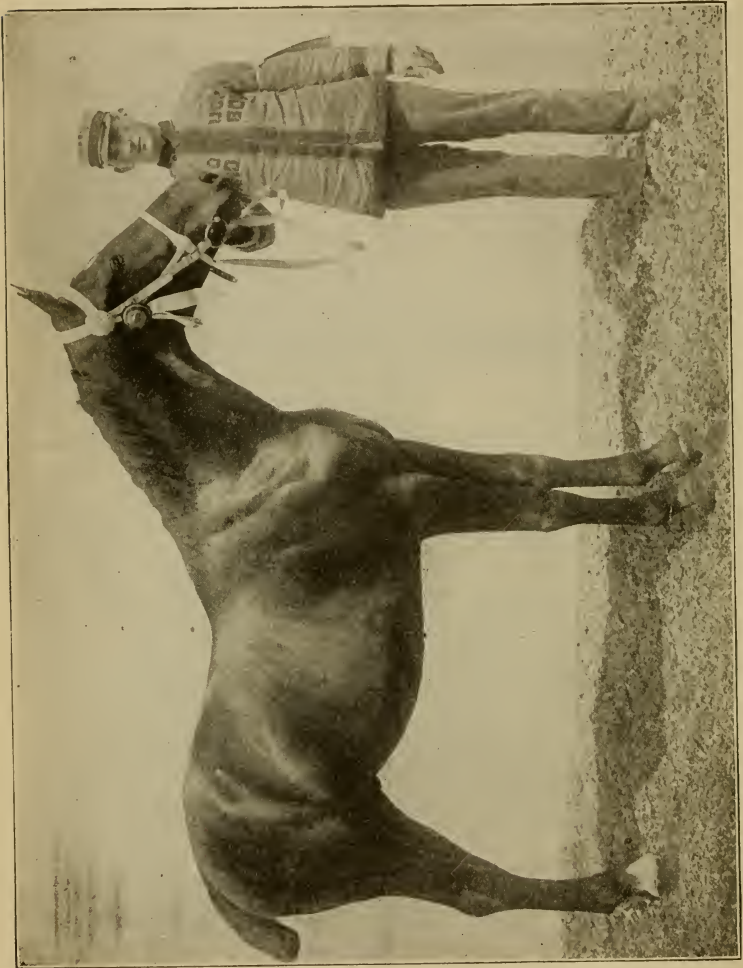
floundering in and out of deep, muddy streams. The horse, the deer-hound, the mastiff and the boy were all good friends, a veritable happy family who were in at the death of many a deer and prairie wolf, before fences obstructed the chase in Northern Illinois.



PRIZE WINNING SADDLE STALLION.
Specially photographed for this work.

A Heavier Hunting Horse.—The next illustration shows a heavier hunting horse for the saddle, when speed and bottom are desired. He is a horse of good style and action, capable of long and high speed under

the weight of a man of 180 pounds — and heavier men should never hunt. Such a horse should be capable of great speed when called on,



IMPORTED GERMAN COACH MARE.
Specially photographed for this work.

able, and willing to take any leap a sensible man would put him at, and sure-footed to a high degree. To this end, every hunting horse should have large lungs and heart, the best possible form, hard, firm bones,

strong tendons, and great muscular power. He should be cleanly formed, oblique shouldered and fetlocked, with high withers. If, in addition, he have what is called a double loin, he will carry his rider safely and easily, and combine in his form all the requisites of a good saddle horse, that will leave any cold-blooded horse blown in a very short trial of bottom; for the horses we have been describing are not found outside the range of highly bred animals. Nevertheless, it must be remembered that the hunting horse is not to be put to the labor of draft; in fact, he should never be harnessed. He is a saddle horse, and the form required to move easily in harness, and especially under a load, would soon unfit him for the saddle, and for the hunting field.

X. Light Driving Horses.

The light driving horse is not required to have high speed; eight to twelve miles an hour is sufficient; but he must be of unimpeachable style and action. Such horses are much sought, for driving on smooth roads, in parks and pleasure-grounds, where style and luxurious surroundings are the rule. They are also valuable for any service when only one person, or, at most, two light ones, are to be carried, since they will often go rapidly over roads with one person where heavier horses would labor.

Here, again, we present an English type which shows a horse, the perfection of style and action, in movement. Sometimes they are fast, but not when going in the form shown in the illustration. The head is out of position for fast work, but is right for style and dainty movement. It will be observed that there is no check-rein. The horse has been trained under a curb, and requires nearly as light a hand to manage as though under the saddle.

XI. Coach Horses.

The carriage horse bears to the coach horse the same relation that the light driving horse bears to the roadster. Horses, for the light or medium-weight carriage, should be handsome in appearance, and of better speed than those used for the coach or boxed-in vehicle. Any road-horse of 1050 to 1100 pounds will be suitable for the light or medium carriage. For the coach, a more stately animal is sought. He may have rather long limbs, if he is otherwise of suitable form and of good style; but he must not be deficient in muscular power, since a fair speed is required, and without muscle no horse can drag a coach over muddy, difficult roads. The illustration we give of an English coach horse shows a long-limbed, rangy horse, stylish and muscular. He should be from 16 to 17 hands high, with clean-cut head and neck, since only this class of horses can acquire the high stepping action, so much sought by

those able to own, and have driven for them, in the functions usual in city life by the wealthy. In the United States, for the heavy coach, the German Coach horse is preferred by many. The better class are admirably suited therefor. The horse, however, that most closely fills the bill, both for the family carriage, the close coach, and the drag, to our mind, is the French Coach horse, having great style, elegant proportions, upright carriage, high speed when necessary, and undaunted courage, and the proof is that in these last years of the last decade of the century, they are taking the bulk of the prizes at the horse shows, East and West. The flash action of Indra fully shows pure trotting style. Is there better hock and knee action than that of Palestine, shown on page 260, or more grace, dignity and majesty than in Perfection, shown on page 270? These won, over all breeds of any age or size, and with Palestine, the Challenge Cup, at Chicago in 1897.

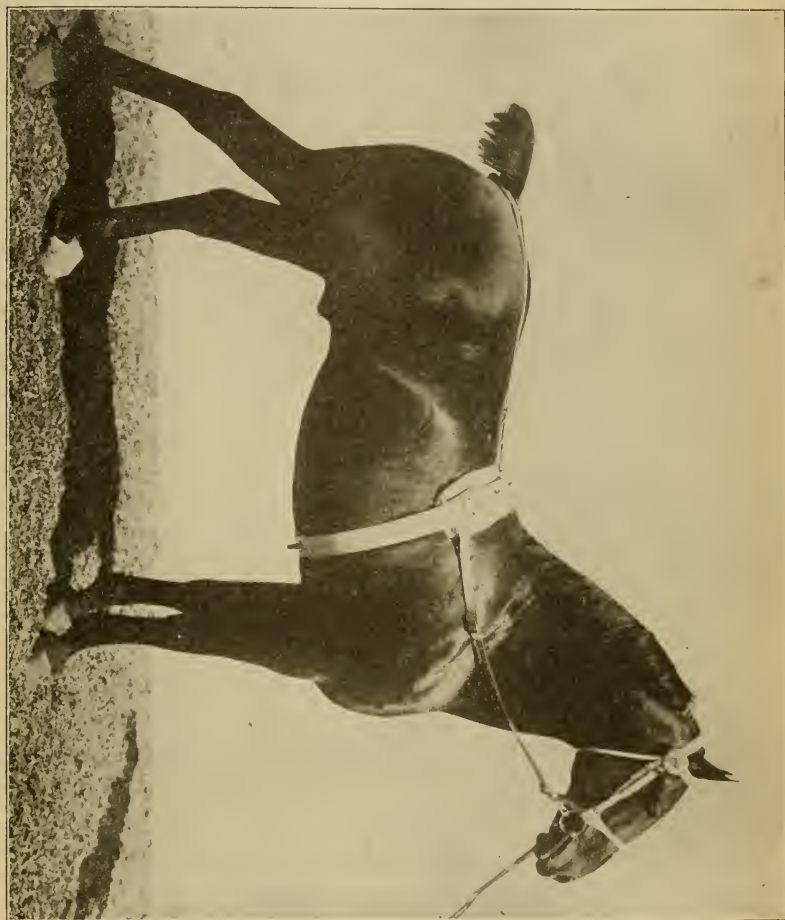


FIRST PRIZE TWO-YEAR-OLD MORGAN STALLION.
Specially photographed for this work.

XII. The Cleveland Bay.

We come next to a class of horses always held in the highest esteem for their many valuable qualities. It is a horse that is now bred to a degree of perfection that leaves little to be desired in all that goes to constitute size, style and ability to perform any labor that may be required except the heaviest drudgery. The Cleveland Bays are good carriage

horses, good and stout wagon or plow horses, and they match together about as easily as Devon cattle, combining, as they do, plenty of staunch



IMPORTED GERMAN COACH STALLION HANNIBAL 2127.
Specially photographed for this work.

thorough blood, with fair size and constitutional vigor. When first introduced into the West, they speedily grew into favor, but later the Percheron and especially the French Coach horse and the German Coach horse, as combining full size, speed and greater strength, have superseded them in

great measure. The Cleveland Bay is remarkable for color, a pure bay, dashed only at the fetlocks and in the forehead with white.

XIII. The French Coach Horse.

The French Coach horse is as near perfection as a speedy, showy horse, of great courage and endurance, of ample height and contour can be, and of weight sufficient to carry a good weight at a fast pace when called on. Their colors, too, are solid, as to the body, being, as a rule, when well bred, bay, brown or black, relieved often with a white star in the forehead, with dashes of white on the fetlocks. Their breeding has been most careful and scientific, having been entirely under the control of the Government of France. This consists, first, of stallions owned by the Government itself; second, stallions belonging to private individuals inspected and approved by the Government, such approved stallions receiving from the Government, as long as they are so kept, from 300 to 3,000 francs per annum, according to their breeding and superior excellence; third, authorized stallions—animals that by Government inspection are pronounced of good quality and worthy of public patronage; therefore, the fixity of type is fully perfected. The French Coach breed, instead of being the product of a multiplicity of ideas, has been developed under the exclusive guidance of the Director-General of the National Studs of France, and as these officials are educated in the same school from generation to generation, are taught to value the same form, seek for the same qualities, and pursue the same system, we can understand how it has been possible for them to attain such high perfection and great uniformity in the horses of the country. The power exercised by the Inspector-General is extraordinary, controlling as he does the selection of the 2,500 stallions owned exclusively by the Government and the thousands of others annually inspected, which must obtain his approval before receiving their permits and subsidy; and further, all breeders are confined exclusively to the use of animals inspected and licensed by this department. This places horse-breeding entirely under Government control as far as the stallions, which greatly control results, can do. Hence, we do not hesitate to state, as an individual opinion, that, as now constituted, they are the peer of any other coach horse in the world.

XIV. The Hackney Horse.

As a well-bred harness horse, high stepping, active, swift and elegant, the English Hackney now stands in the first class, both East and West. Some men, who ought to know better, imagine that they have Mongrel blood in them. Far from it. An English authority of note, in 1894, says that it is to the Darley Arabian (imported into England in 1706), that all the noted Hackney sires of to-day are to be traced without a flaw. The Darley Arabian begat Flying Childers, which was the sire of Blaze, which



HACKNEY STALLION ELY ASSURANCE.

HACKNEY STALLION ELY WISE LAD—8460.
International winners.



A CHOICE FIVE-GAITED SADDLER.

This horse is pronounced by expert judges to be almost perfection in type. Note his length of neck, height of withers, shortness of back, strength of loin and long, level croup. Such a conformation is well suited for carrying weight. The picture shows him to be a little too straight in the front pasterns. Height, 16 hands; weight, 1175 pounds.

Five-gaited saddle horses, sometimes spoken of as gaited saddle horses or American saddle horses, are distinctly an American product. A recognized type has been brought about by skillful selection and breeding for more than half a century. The principal requirements are that they possess at least five of the recognized distinct gaits under the saddle, to-wit: walk, single foot or rack, running walk or fox trot, and canter.

The five-gaited saddler should stand from 15 to 16 hands high and weigh from 900 to 1200 pounds, the most desirable height being 15-2 to 15-3 hands and weigh around 1050 to 1150 pounds. He should be of a kind disposition, have a good mouth, possess courage and ambition, and the conformation of a weight carrier. His head should be fine, clean cut, and breedy looking; his neck long, arched, and set on an oblique shoulder with muscles extending well into the back, the withers high and well finished. An oblique shoulder is imperative or he will not be able to go the required gaits with ease to himself and rider. In order to carry weight well he should possess a strong, level, short back and be closely coupled. His legs and quarters should be well muscled, croup not drooping, and he should carry a long, flowing tail.

begat Shales, and from this latter sire are descended, in a direct line, such well-known Hackney sires as Driver, foaled in 1765; Fireaway, foaled in 1780; Fireaway, foaled in 1815; Wildfire, foaled in 1827; Phenomenon, foaled in 1835; Performer, foaled in 1846, and Denmark, foaled in 1862. The progeny of Denmark is known all over the world through his son Danegelt, who is the sire of Matchless of Londesboro, Ganymede, Lord Wilton, Saxon, Gen. Gordon, Astonishment, and others too numerous to mention. Although many Arabian stallions found their way into England in the course of the fifty years prior to 1800, the infinite superiority of those old Eastern sires, the Darley Arabian, imported in 1706, and the Godolphin Arabian, about 1730, has never been surpassed and it is remarkable, but nevertheless true, that these two animals not only founded the English race horse, or Thoroughbred, but also the Hackney breed. They have continually increased in value of late years, and bring high prices when bred by horsemen of intelligence and aptitude in their art.

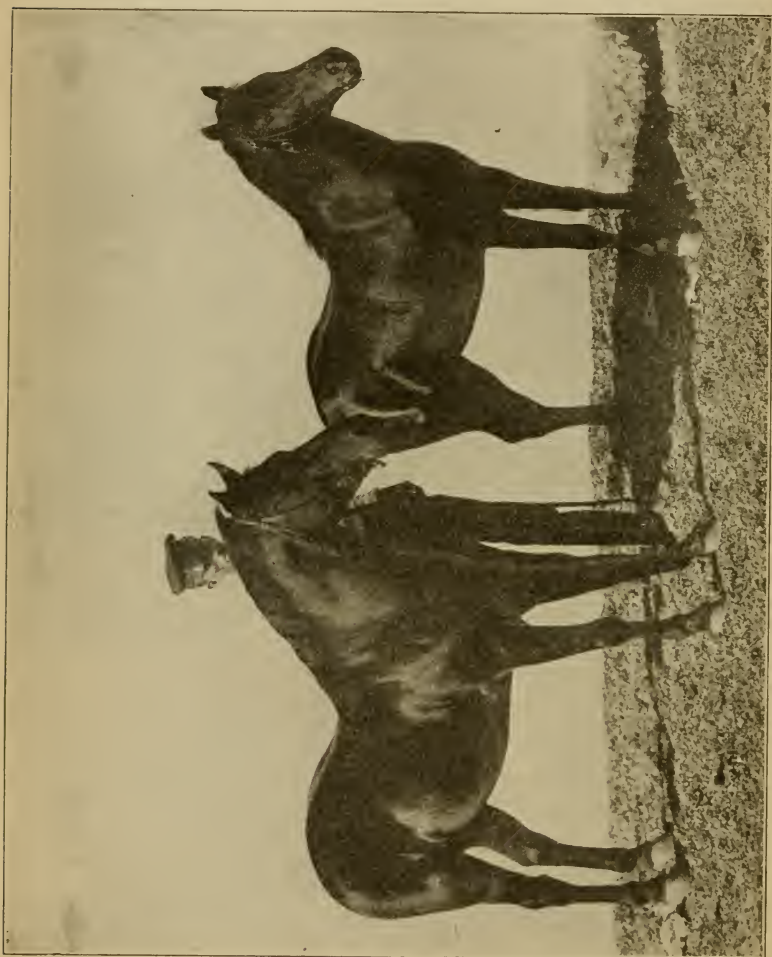
The Gaited Saddler.

The "combined" horse or Gaited Saddler is a product of Kentucky. It is a horse combining fine action, docility and intelligence to acquire gaits, and, as now bred, has the heredity that makes the several gaits come natural. Hence, when acquired, they are not lost from disuse. It is an animal that is as good in the light carriage as under the saddle. Now is it the fact that light driving injures the horse for saddle purposes, as some suppose? It is true that combined horses are not plentiful, but they are becoming more and more so year by year. But do not acquire the belief that any harness horse may become a saddler. The walk, trot and canter does not constitute the saddle horse of to-day. The gaited saddle horse must have saddle horse breeding, saddle horse action, saddle horse instinct, and saddle horse education.

XV. Ponies.

Ponies are much sought, of late years, for children's riding, and for pony carriages. Indian ponies, Canadian ponies, and Shetlands have all been called into requisition, while in the West and South the smaller Mustangs of Texas are used. Unless taken young, the Mustangs are wild, intractable, and often vicious. The Indian pony is fast becoming extinct, and Canadian ponies are also growing scarce. These latter, many of them, are really handsome, small horses, of thirteen to fourteen hands high, hardy, docile and of the most steadfast nerve, courage and bottom. They are self-willed, but perfectly tractable if not abused. Shetland ponies are still smaller, and rougher; but they are ambitious little fellows, and scamper along easily at a good pace, with a twelve year old boy or girl on their backs. The illustration shows a group of these hardy little animals. It is claimed that

no true Shetland can be more than eleven hands high, and some of those in the extreme northern isles of Tell and Unst do not exceed seven and



REGISTERED HACKNEY PONIES.
Specially photographed for this work.

a half hands. The average is from nine to ten hands. Although the smallest of ponies, they are the most perfect in form, round and closely

ribbed-up, with lean bony heads, wide between the eyes, and otherwise well shaped, very muscular, with coarse bushy manes and tails. They are gentle and easily trained; and it is said that some of them are capable of carrying a light man forty miles between sunrise and sunset.

The Mustang.—The Mustangs are undersized and not handsome; descended from horses gone wild after escaping from the early Spanish adventurers, they have degenerated owing to the scanty fare and hard usage received at the hands of their Indian masters. They are of various colors, as are all the semi-wild horses of Texas and Mexico. The Indian ponies found in the West are undoubtedly of the same origin as the Canadian pony. They are pure, but modified, Norman, escaped from domestication and bred in a half wild state by the Indians of the Northwestern States and Territories. They are larger and heavier than the Indian horse or Mustang of the Southwestern plains and are in every way superior animals. Sometimes they are fourteen hands high, but the average is about thirteen hands. They are compact, closely ribbed, stout, muscular, courageous little fellows, docile and sagacious in the extreme, with wavy tails, and shaggy manes falling on both sides of the neck. If carefully bred in high northern latitudes, and well-trained, they would make admirable children's ponies and would readily sell for large prices to the wealthy.

XVI. The Vermont Draft Horse.

This is another breed of horses of most admirable qualities, specimens of which are now very rare, probably because their use in cities has been superseded by the introduction of the Percheron, Clydesdale and other heavier animals. The Vermont draft horses would weigh from 1,150 to 1,200 pounds; of fine breeding, clean-limbed, handsome, muscular, with fine crests, capable of drawing heavy loads at a good pace, they were in the days preceding the advent of the locomotive, the crack horses of the stage companies of the Northern New England States. As cavalry horses, they were said to have no superior, since they moved with speed, alertness, and with great force and power by reason of their weight. It is to be hoped that we may find, in the Cleveland Bay and his crosses, as good an animal of all work, both for saddle and harness.

XVII. The Narragansett Pacer.

Here is another of the extinct races of American horses, one that is said to have originated in Rhode Island, from an Andalusian stallion brought from Spain at an early day. They were largely raised, during the last century and the first part of the present century, for exportation to the West India Islands for the use of the families of the planters. Their only gait was a pace of the most perfect and easy-going description. They are reputed to have been so easy-going that ladies could ride

them forty miles a day for many days in succession without experiencing excessive fatigue. That they were horses of great bottom, and sometimes of extraordinary speed, is undoubtedly true. The Colonial divine, Dr. McSparren, in his "America Dissected," speaking of the horses of Virginia, says: "There were plenty of a small sort of horses—the best in the world, like the little Scotch Galloways; and 'tis no extraordinary journey to ride from sixty to seventy miles in a day. I have often, but on larger pacing horses, rode fifty, nay, sixty, miles a day, even here in



CHAMPION GAITED SADDLE MARE LADY GLENN.

New England, where the roads are rough, stony and uneven." Again, speaking of the Narragansett pacer particularly, as an animal for export, he says: "They are remarkable for swift pacing, and I have seen some of them pace a mile in a little more than two minutes, and a good deal less than three." The good doctor probably did not hold a timing-watch on them. The story, however, is fully as credible as that other story of Flying Childers having run a mile in a minute.



FRONT VIEW PRIZE WINNING BELGIAN HORSES.
Specially photographed for this work.



XVIII. The Shire.

The Shire horse traces his history to the days of the Roman conquest—one of the oldest of the well defined breeds of unbroken lineage. He was used in the early periods as a war horse because of his size and ability to bear heavy burdens when armor was worn. He was in general use for this purpose in the 16th century. Paintings dating back to the 15th century represent him in the perfection of form.

The special home of the Shire horse is in England, especially in the east central part in the counties of Norwich, Derby, Leicester, Nottingham, Northampton, Huntingdon, Lincoln and Cambridge. He is found, of course, in other sections of England, including the low-lying lands. He is mentioned in English history as the Great Horse, the War Horse, the Cart Horse, the old English Black Horse, the Lincolnshire Giant, as well as the Shire. Some of these names were current at the period of Oliver Cromwell.

Like every other standard breed he has improved by the infusion of blood, notably the north German and Flanders blood, which is represented in the best samples of the English horse. Like the other standard animals, he is today in his perfection the result of more or less mixed breeding.

In the latter part of the 18th century Robert Bakewell greatly improved the Shire under the name of the Leicestershire Cart Horse. This improvement was made by systematic crossing with English stallions. He pursued a careful course of selection and added greatly to the value of the breed. It was during the 18th century that this horse came into special use for draft and farming purposes, as the coat of armor had become obsolete and, hence, the demand for Roman war less imperative. As a draft horse he came into special demand with the improvements of roads and the use of coaches. In a most interesting historical work Gilbey gives illustrations of Shire horses which are copies of paintings by distinguished artists of a period dating as far back as 1792. There are many of these well known paintings which established the existence and the popularity of the Shire horse at that period. The old-fashioned type of Shire horse was, however, coarse and slow, with big heads, coarse ears, thick lips with long hairs on them. The pasterns were straight, the legs hairy and the shoulders heavy. They were mild of temperament but sluggish in action. The pictures would indicate great excess of hair, which does not exist. The modern English Shire, while retaining these characteristics, they are modified, but, as at present, his body was massive, compact and round, his limbs strong, his chest notably broad and his neck and back short. The present characteristics of thick mane, hairy legs below the knee and down to the heels have always pertained to him. As a draft horse for heavy weight, he is admirable and

useful. For quick action and mettle his bulky body, conformation and temperament unfit him. In a Standard Stud-book the different varieties of the Shire that formerly existed in England are classified as three, as follows:

(1) Those having the upper lip garnished with a long, thick moustache, considered at one time a distinguishing characteristic of the Lincolnshire horse.

(2) Horses having the lips, muzzle, and eyelids destitute of the hair. The skin in these places is either entirely bald or covered with exceedingly fine down, is almost invariably flesh colored, and is sometimes marked with small dark spots and blotches. These are termed bald horses or bald faced.

(3) Those having a long tuft of hair growing from the front of each knee, and rarer examples having also a similar growth from the hind part of the hock, just below its point. This is quite different from the ordinary hair on the back of the cannons.

The Shire of today is a marked improvement over the horse of fifty and one hundred years ago. The features of large size, hairy legs, and draft type have been maintained, but he has in his improved condition more action, spirit and life, has more grace of form and quality of finish and more uniformity of type. The standard breeders recognized the need of an immediate improvement of their draft horse for emphasizing quality, action, flat bone and uniformity. This improvement has been greatly aided by the Shire Horse Societies.

He is the largest of the British draft breeds and is excelled in weight only by the Belgian. Stallions weigh from 1,800 to 2,000 pounds and are comparatively common, massiveness having long been sought by Shire breeders. In height the Shire stallion should stand close to seventeen hands, although the average is about two inches less. The color of this breed is somewhat variable, though of recent years bays and browns have been most common, white markings on the face or forehead and on the legs below the knee or hock being likewise characteristic. In a minor degree there are shades of roan, gray, black, sorrel and chestnut. The barrel of the Shire is larger and deeper than that of the Clydesdale, thus giving more weight. The legs are large, powerful and the bone fairly flat. British critics in the past have objected to round cannons, and flatter, stronger legs have become more common in recent years. The back of the cannon bones, knees and hocks have long, flowing, fine hair in the best specimens of the breed. Excessive leg hair is objected to as indicating too much sluggishness and lack of quality. Less hair and finer bone is preferred. The pasterns have been subject to criticism as being too short and not sloping enough, though modern types show improvement here. The feet are large and inclined to be flat at the

heel. The head is somewhat Roman in profile and there is a lack of breadth between the eyes which is noticable and not to be desired. The croup is long and broad but not so level as that of the Clydesdale, though the difference is not great. The action is greatly improved over early days notwithstanding the Shire is more deficient in this feature than the other draft breeds as it still preserves more or less of its early inherited sluggishness.

There are American critics who charge the breed with lack of action, with too hairy a leg, which will probably never be popular in this country, and with too flat a foot. This objection has had the effect to limit the number of Shires imported to this country in recent years. We have no absolutely definite data as to the period of the first importation of the Shires to America. It began many years ago. We have record of an importation to Canada in 1836 from England. Another noted horse named King Alfred was imported in 1847. A noted importation was that of the horse John Bull, which was brought from England to Illinois in 1853. Others followed to an extent that made northern Illinois somewhat famous for its Shire horses.

The first advertisements of Shire stallions in this country were as late as 1875. They were then popularized to the extent that many were imported but in later years the importations have decreased.

The objectionable features of the Shire horse are greatly relieved by crossing with large mares and at the same time the typical Shire conformation is preserved. The typical hairy legs, which is a chief objection, is preserved in the crossing. The Shire breed is confined almost wholly to English speaking countries, having, however, his greatest popularity in England where he is recognized as the really great draft breed. In America the breed is confined largely to the states of Illinois, Indiana, Ohio, and the states of the upper Mississippi valley. The demand for the Shire horse is especially marked in cities. His heavy weight makes him of special value for draft purposes in large cities. In such he commands high prices ranging from \$400 to \$900, the latter being the highest record. As a show horse he has not excited great attention or become especially popular in America. The conditions in England being different, the Shire exhibitions there are very notable events. A recent annual show of the Shire Society in England brought together an entry of 700 stallions and mares. This, however, has no parallel in America. There are a half dozen prominent importers of the Shire horse, especially in Ohio and Illinois, whose business has been well sustained by a profitable demand. The rapid growth of our cities of the first, second and third class will increase this demand and sustain the improvements of the breed.

XIX. The Belgian Horse.

The Belgian horse takes his name from the country of his nativity—Belgium. That country was famous for producing horses at the beginning of the Christian era. The man and the horse seem to have had close relationship in that country in pre-historic times. They have bred and raised horses not only for their own use but for export to all civilized countries. Their inability to meet demand is a matter of record and accounts for good prices always maintained. It was one of the leading industries in that country at every period of its history. The industry of that country has received special recognition from the government which established a stud for stallions by way of encouragement and assistance in that industry. Much attention has been given to the improvement of the draft horse. That is the only horse receiving special recognition and assistance from the government.

The methods employed by the Belgium government to encourage horse breeding are interesting. State regulations concerning the breeding of draft horses are subject to constant supervision. The government expends annually 350,000 francs, equal to \$70,000, in behalf of that work. The money is used to meet the expenses of shows, of foals and mares, which are fixed by provincial regulations and which occur in some 44 different places. Stallions are submitted for examination at these times and places. At these shows large monetary prizes are offered for first and second prizes for the best specimens of the horse of different ages. Careful records are kept of the horse winning premiums and two or three successive premiums entitle the winner to compete for a bounty of about \$1,200 payable annually as long as the horse remains approved by a commission of examination and retains its value. At the end of five years the owner of such a stallion, if it remains approved, may continue to enjoy an annual maintenance of from 600 to 800 francs. In case a stallion that has received the 600 francs bounty is sold to leave Belgium the premiums received must be returned to the treasury of the state. There is an annual competition in each province for stallions four years old or over that have won the above special prizes at which they may compete for a first prize of 900 francs and a second prize of 700 francs. The government encouragement and government aid have been great factors in the development and in the world supply of this noted horse.

The history of the Belgian draft horse in America is comprised within fifty years. The breed was especially promoted in this country in 1888 by a citizen of that country, by name Mr. E. Lefebure, who settled in Iowa. From 1888 until his death in 1905 he was active in promoting the breed of the Belgian horse in this country.

XX. Characteristics of the Belgian Horse.

The general conformation is of the most compact form, this breed having a maximum of weight within a given space. The body is very full in the breast and unusually broad and deep in the back, no breed in proportion to its size showing so much body girth. Symmetry of form is not as frequent as in some other breeds, or as should be wished, owing to a rather characteristic steepness and shortness of rump extremely common with Belgians, with the tail set rather low. The head shows considerable refinement and is carried with spirit on a short, symmetrical neck. The head, neck and rump rather suggest the French breeds in style and carriage. The legs of the Belgians are devoid of long hair and are notably short. Compared with an ordinary draft horse one is impressed by the closeness with which the body comes to the ground. While the legs may not be open to objection, frequently there is a tendency to too much lightness of bone and lack of substance to support the body weight and withstand the most severe labor. The hocks do not show great depth and strength as frequently as might be desirable. The feet has been an important criticism of the breed by Americans. These tend to be small and lack in circumference at the crown besides being high and narrow at the heel. Probably no class of draft horse brought to America has had the feet so severely criticised as does the Belgian. There is reason in this objection if the specimens exhibited in America are a fair basis of judgment. The Belgian is somewhat slow in action though some remarkable actors have been seen in our shows. In a recent International Live Stock Show there was one exhibit of a Belgian with stride and style most unusual in a draft horse of any breed.

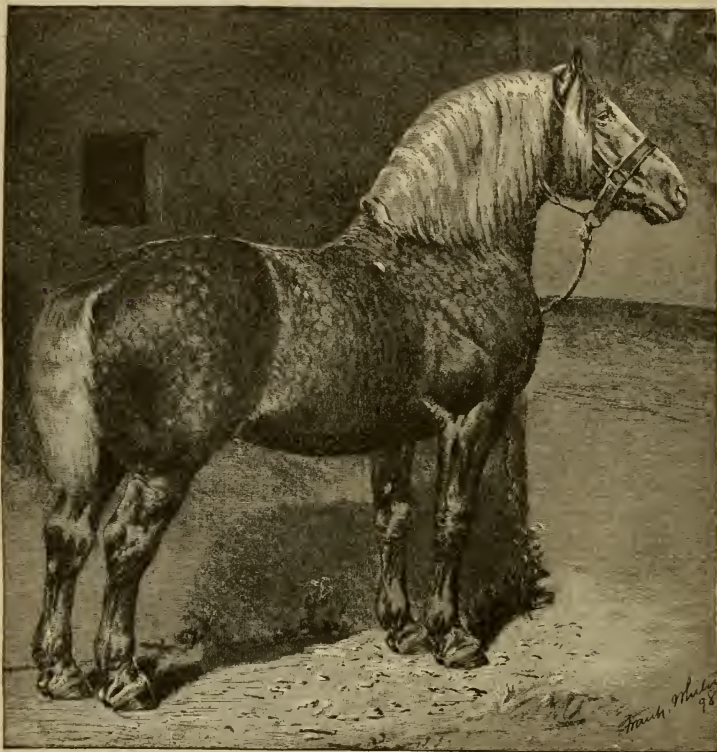
The chestnut is the most popular in color though they are frequently found in bays, bay-browns and roans. The gray Belgian is not in favor either here or in his native country. Height and weight vary.

At the Louisiana Purchase Exposition in St. Louis, there was a special commission from Belgium in charge of the exhibit of Belgian draft horses. The exhibit was especially representative of which three types were distinct and noted. These three types represented three different sections of the country from which they came. Those from Flanders ranged in height from 16¾ to 17 hands or more and the weight of the stallion about 2,000 pounds. Those from Brabant, another section, stand 15¾ to 16¾ hands and the stallions weigh about 1,600 pounds, while those of the Ardenais stand from 15 to 15½ hands in height and weigh about 1,200 pounds.

The Belgian draft horse stands without a superior in temperament. This is due, no doubt, to the fact of being raised in a country having

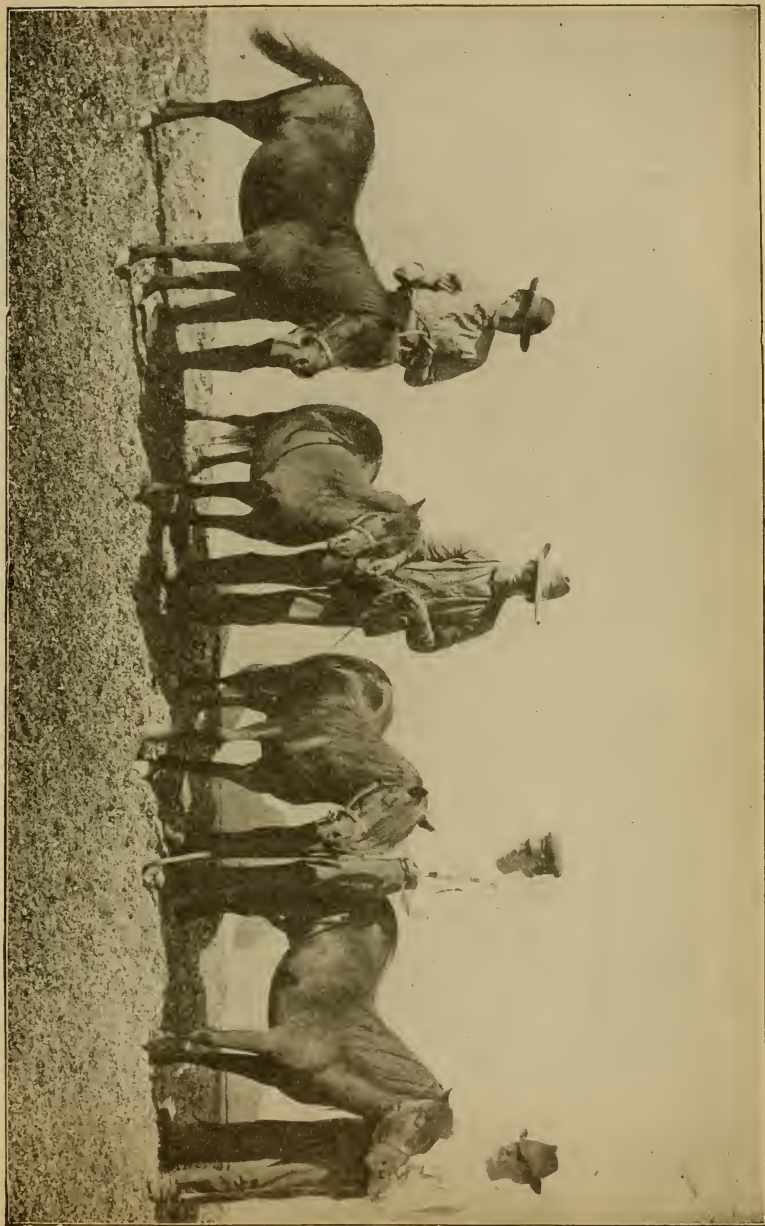
small farms where he is in close, every-day contact with the life of the people. They are docile of temper and have great draft power.

There is a cross bred Belgian horse but he has been little seen in the United States. He is popular where he is known. The horse, on the whole, has an attractive individuality. They seem to be sound of limb



ONE OF THE FAMOUS ONES

and possessed of blocky form and weight, so much in demand for heavy hauling. There is a widespread distribution of the Belgian draft horse to Germany, England, Holland, Sweden, France, Denmark, Austria and the United States. In this country he is best known in Iowa, Illinois and Indiana. They are, however, rapidly becoming distributed over the Mississippi valley states north of Ohio, where the heavy draft horse is most needed.



SHEPHERD PONIES. Specially photographed for this work.

CHAPTER VII.

THOROUGHBRED HORSES.

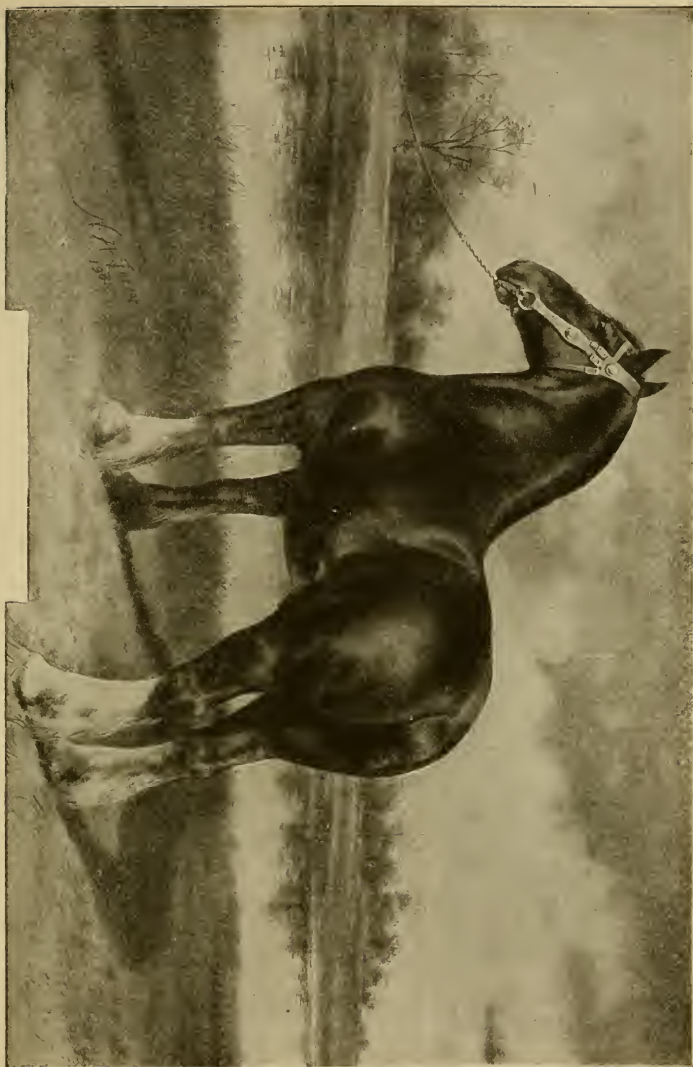
I. ENGLISH THOROUGHBREDS.—II. HERBERT'S HISTORY OF THE ENGLISH HORSE.—
III. THE FIRST LONDON RACE COURSE.—IV. HORSES TAKEN TO ENGLAND BY
CRUSADERS.—V. BONE AND BULK IMPARTED TO THE ENGLISH HORSE.—VI. THE
HORSE IN THE TIMES OF HENRY VIII AND JAMES I.—VII. AMERICAN THOROUGH-
BREDS.—VIII. THE ARABIAN.

I. English Thoroughbreds.

The English thoroughbreds are horses of mixed lineage. They are not a pure race, bred for hundreds of years without admixture of foreign blood; but they rather owe their great excellence to the crossing of Arabian, Barb, and other Oriental blood, upon the best racing stock of the last and the preceding century. The English have been famous, during the last thousand years, for their horses, especially for horses of speed and endurance. They have always had a passionate fondness for the chase and for racing; and their kings and nobles have done much to keep alive this feeling, by securing, from time to time, the best foreign blood that could be secured to impart fresh stamina and vigor to their stock of horses. Many persons are prejudiced against thoroughbred horses, because they have been used for gambling purposes on the turf, but this fact should not be allowed to create hostility against valuable animals. As well might wheat and corn be placed under a ban because these indispensable cereals are used for purposes of gambling speculation. It is this passion for trying the speed of horses, which has prevailed during the last ten centuries, that has led to the selection of the best breeds and given an impetus during the past 100 years to really scientific breeding. And it is to these latter causes that we owe all that is of value in any of the improved breeds of horses existing to-day, not even excepting our draft horses. Let us look at the history of the blooded horse of England, and view its gradual rise and progress, even from beyond the Christian era.

II. Herbert's History of the English Horse.

Henry William Herbert, in his admirable and voluminous work on the Horse of America, now unfortunately out of print, has traced the English horse so carefully, and at the same time so concisely, that one cannot do better than extract therefrom matter that otherwise the mass of the readers of to-day could not come at. He says, upon the authority of Youatt: "That horses were introduced into Britain long before the Christian era, we have abundant evidence, and that the inhabitants had



GIRTON ENSIGN 5733 (18040).
 Winner at London Horse Show.
 Two years old. Weight 1875 pounds.

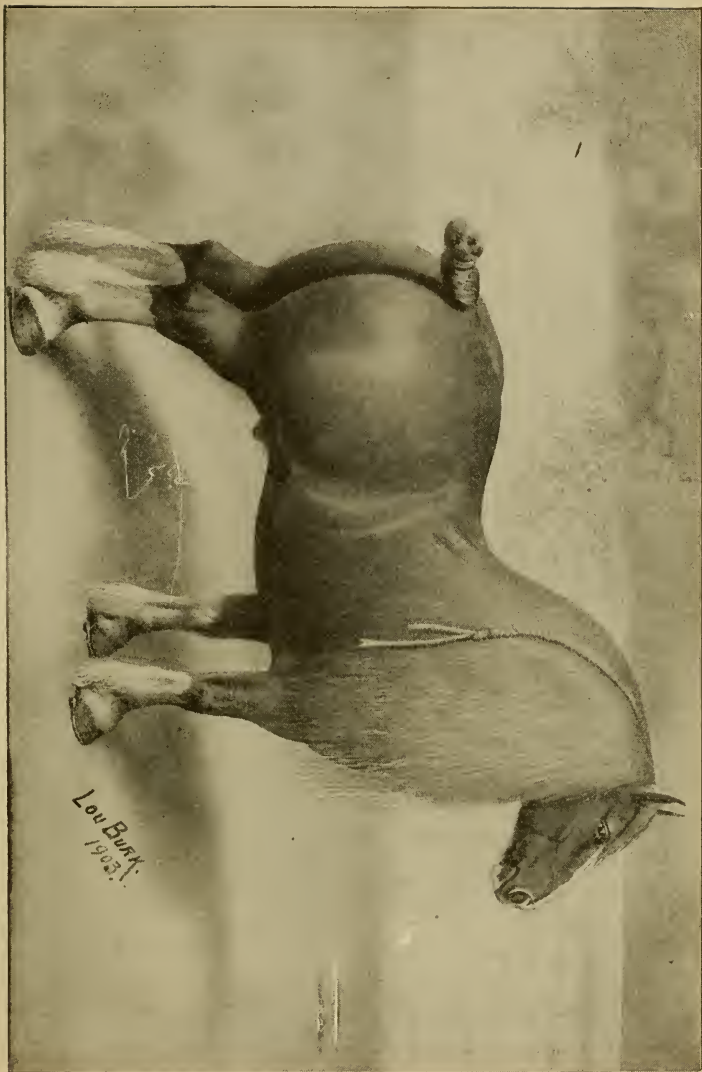
acquired great experience in their use is equally certain. In the ancient British language *Rhediad* is the word for a race—*rheder*, to run—and *rhedecfa*, a race. All these spring from the Gaulish *rheda*, a chariot. Here, then, is a direct evidence that horses were introduced from Gaul, and that chariot-races were established at a very early period.'

'This evidence' says Mr. Herbert 'is not to my mind direct or conclusive, as to the fact of the introduction of the horse from Gaul; although it is so, as to the antiquity of chariot-racing in both countries, and to the non-Roman descent or introduction of the British or Gaulish animal. As the blood, the religion and the language of the Britons were cognate, if not identical, with those of some, at least, of the Gallic tribes, it is no more certain that the Gallic *Rheda* is the theme of the British *rheder*, than that it is derived therefrom. It does, however, in a great degree prove that the Gallic and British horses were identical, and descended not from any breed transmitted through Greece and Italy, but from one brought inland to the northward of the Alps; perhaps by those Gauls, who ravaged Upper Greece and Northern Italy, almost before the existence of authentic history; perhaps by their original ancestors; at all events, of antique Thracian or Thessalic descent, and, therefore, of remote but direct oriental race, in all probability again improved by a later desert cross, derived from the Numidian cavalry of the Carthaginian Bareas, long previous to the Cæsarian campaigns in Gaul or the invasions of the sacred island of the Druids. This, however, is of small immediate moment, and is more curious and interesting to the scholar and the antiquary, than to the horseman or horsebreeder.

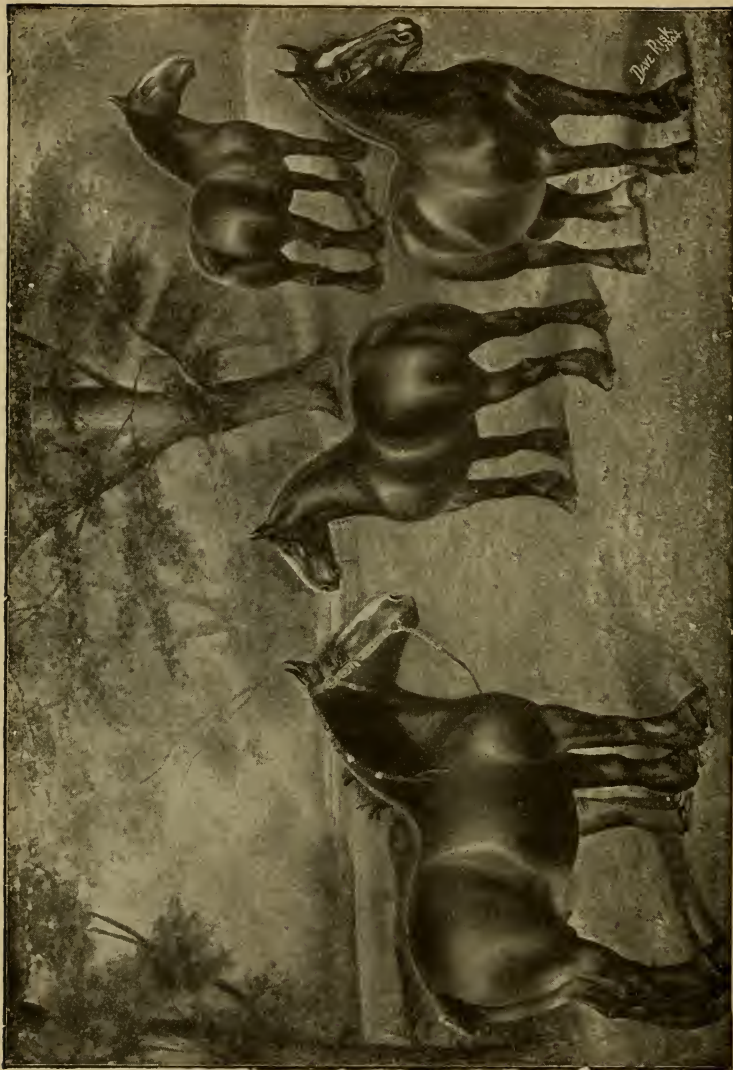
'From the different kinds of vehicles, noticed by the Latin writers, it would appear that the ancient Britons had horses trained to different purposes, as well domestic as warlike.

'It is well observed by Youatt, in his larger work on the horse, that from the cumbrous structure of the car, and the fury with which it was driven, and from the badness or non-existence of roads, they must have been both active and powerful in an extraordinary degree. 'Cæsar,' he adds, though without stating his authority, 'thought them so valuable, that he carried many of them to Rome; and the British horses were, for a considerable period afterwards, in great request in various parts of the Roman empire.'

'During the occupation of England by the Romans, the British horse was crossed to a considerable extent by the Roman horse,' continues the author in the volume first quoted; for which I would myself, for reasons above stated, prefer to substitute *by the foreign horses of the Roman mercenary or allied cavalry*, and yet, strange to say, no opinion is given by any historian, Roman or British, as to the effect of this. After the



SHIRE STALLION DRAYMASTER.
Formerly owned by King Edward VII. of England



SHIRE MARES. — World's Fair and International Winners.

evacuation of England by the Romans, and its conquest by the Saxons, considerable attention was paid to the English breed of horses, and we know that after the reign of Alfred, *running horses* were imported from Germany;’ this being the first historical intimation we have of running horses in England. It is scarcely to be doubted that this importation produced a marked effect on the character of the native breed, but here, as before, no historian has thought it worth his while to record the fact of either improvement or deterioration.

“ ‘English horses, after this, appear to have been highly prized on the continent, so that the German horses which were presented by Hugh Capet to Athelstan had been turned to good account. The English themselves were, however, anxious to preserve the monopoly of the breed, for in 930, A. D., a law prohibited the exportation of horses. In Athelstan’s reign many Spanish horses were imported, which shows the desire of the English, even at that early period, to improve the breed. It is no wonder that their descendants should have produced the finest horses in the world. Shortly before the Norman conquest a horse was valued at thirty shillings, a mare or colt at twenty shillings, an ox at thirty pence, a cow at twenty-four pence—these prices in case of their being destroyed or negligently lost—and a *man* at a pound.’ Money, it should be noted, then being equivalent to at least fifteen times its present value. William the Conqueror took great pains to improve the English breed, introducing many fine animals from Normandy, Flanders and Spain. This monarch owed his success at Hastings chiefly to his cavalry; his own horse was a Spanish one. In this reign we have the first notice of horses being employed in agriculture. They had been used for the saddle for many centuries, Bede informing us that the English began to use horses as early as 631 A. D., and that people of rank distinguished themselves by appearing frequently on horseback. During the Conqueror’s reign the then Earl of Shrewsbury, Roger de Belesme, brought a number of Spanish horses to his estate of Powisland. The breed issuing from these is highly eulogized by Giraldus Cambrensis and Dayton. In the reign of Henry I. we have an account of the first Arab horse imported into the country. It was presented by Alexander I., King of Scotland, to the church of St. Andrew’s, with many valuable accoutrements and a considerable estate. History, however, is silent as to the purposes to which this animal was devoted, or as to what ultimately became of him.

“ It has been well pointed out, in this connection, that the ancient historians, being exclusively monks and churchmen, naturally paid little attention to the breeding of horses, which were held to belong to war rather than to agriculture, and were forbidden to their order; and farther, it may be observed that, until, comparatively speaking, very recent times,

no heed has been given to the statistics of agriculture or animal improvement, and little mention made of such matters, beyond a casual and passing notice, even by the best historians.

III. The First London Race-Course.

“ ‘The English,’ proceeds the work from which I quote, ‘had now,’—that is to say in the reign of Henry I.—‘become sensible of the value and breed of their horses; and in the twelfth century a regular race-course had been established in London, this being no other than Smithfield, which was at once horse-market and race-course. Fitz Stephen, who lived at that period, gives the following account of the contests between the palfreys of the day. ‘When a race is to be run by horses, which in their kind are strong and fleet, a shout is raised, and common horses are ordered to withdraw from out the way. Two jockeys then, or sometimes three, as the match may be made, prepare themselves for the contest, such as are used to ride, and know how to manage their horses with judgment, the grand point being to prevent a competitor from getting before them. The horses on their part are not without emulation. They tremble, and are impatient and continually in motion. At last the signal once given, they hurry along with unremitting velocity; the jockeys inspired with the thoughts of applause and the hopes of victory, clapping spurs to their willing steeds, brandishing their whips and cheering them with their cries.’

IV. Horses taken to England by Crusaders.

“ It is stated by Mr. Youatt, although, singularly enough, he maintains that the crusaders did not introduce eastern horses, that Richard I, did import two from Cyprus, which he observes were of eastern origin. The statement is made on the faith of an old metrical Romance, which is that entitled by the name of the monarch whose feats it celebrated, usually supposed to be of the time of Edward I., and contained in Ellis’s Metrical Romances. The lines are curious, as they indicate a full acquaintance with various animals, natives of the East, and more particularly with the especial qualities of the oriental horse, his speed and sure-footedness.

“ These horses were named Favell and Lyard—

‘ In the world was not their peer,
Promedary, not destrere,
Steed rabyte, ne camayl,
That ran so swift sans fail,
For a thousand pounds of gold,
Should not that one be sold.’

Destrere, is the old spelling of the word *Destrier*, in Norman French, derived from the barbarous, Middle Age Latin, *Dextrarius* signifying a



SHIRE STALLION "BLAISDON PLUTO"—15996.
Champion International.



SUFFOLK STALLION, EPATANT—58100.



SUFFOLK HORSE—CLOOD V.—21279.

war-horse. Edward I. also is known to have introduced horses from the East; and that accurate and inquiring antiquary, Sir Walter Scott, describes his spirit, or the demon of the haunted camp under his form, in the nocturnal tourney with Alexander of Scotland, as being recognized by the horse he bestrode.

‘Alike his Syrian courser’s frame,
The rider’s length of limb the same.’

V. Bone and Bulk Imparted to the English Horse.

“Spanish horses, had come to be renowned, as chargers, so early as the Norman conquest, but it is more than questionable whether their superiority was as yet known to arise from their being traceable, in nearly two thirds, to the blood of the Desert. At this time, it would seem to have been considered desirable to strengthen the English horse, and gain bone and bulk, rather than blood—not, I imagine, as Mr. Youatt suggests in the following sentence, for agricultural, but rather for military purposes; in order to endure the ponderous burden of the mail-clad men-at-arms.

“King John, he says, ‘paid great attention to the improvement of horses for agricultural purposes, and to him we are indebted for the origin of our draught-horses. He chiefly imported Flemish horses’—one hundred chosen stallions on a single occasion; the Flanders horse being—as it was even in the time of Marlborough and Prince Eugene—the most approved cavalry trooper—‘and such was his anxiety to possess the finest stock from these, that he would accept strong horses as rent for crown-lands, and as fines for the renewal of leases. His personal stud was both numerous and excellent.’ One hundred years afterward, Edward II. purchased thirty war-horses and twelve heavy draught-horses.

“Edward the III. devoted one thousand marks to the purchase of fifty Spanish horses; and of such importance did he conceive this addition to the English, or rather mingled blood, then existing, that formal application was made to the kings of France and Spain to grant safe-conduct to the troop. When they had safely arrived at the royal stud, it was computed that they had cost the monarch no less than thirteen pounds six shillings and eight pence per horse, equal in value to one hundred and sixty pounds of our money. This monarch had many *running horses*. The precise meaning of the term is not, however, clear. It might be light and speedy horses in opposition to the war-horses, or those that were literally used for the purposes of racing.”

VI. The Horse in the Times of Henry VIII. and James I.

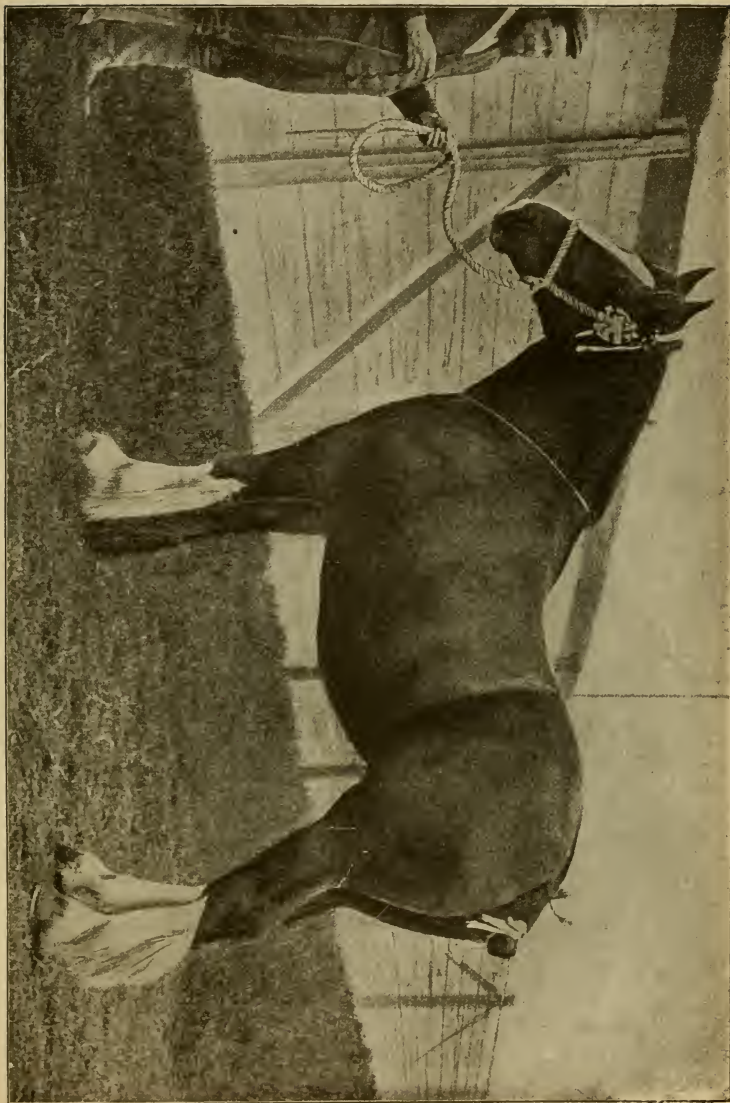
Our authority follows the history of the horse in England up to the reign of Henry VIII., who compelled the destruction of under-sized

horses, and rendered compulsory the maintenance of so great a number of full-sized mares and stallions, in every deer park, and in every rural parish of the realm, that the reign of this monarch was marked by a decided increase in the breeding of powerful, well formed animals. It appears that the King even rode a race himself, for it is stated, by Miss Strickland, that the King rode a-Maying, with Katherine and the royal bride, Mary, widow of Louis XII., of France, and the bride of Charles Branden. The amusements of the day, says Miss Strickland, were brought to a close by the King and his brother-in-law, the Duke of Suffolk, riding races on great coursers, which were like the Flemish breed of dray horses. During the reign of Henry VIII., an annual race was run at Chester, the prize being a wooden ball, handsomely embellished, for which, in 1540, a silver bell, called St. George's bell, was substituted. Hence the phrase, "Bear the bell," in allusion to one who has come off victorious in a contest.

In the reign of James I. races were merely matches against time, trials of speed and bottom for long and "cruel distances." From the time of James I. the history of the English race-horse, and of English racing, may be said fairly to begin, though no existing pedigrees are traced back to that time. But, though pedigrees be not directly traced to great antiquity, enough has been given of the history of English horses to let the reader know how long was the time, and how careful the breeding, required to produce, in the thoroughbred of to-day, the most superb race of horses the world has ever known; for wind, speed and bottom, he is without a rival in ancient or modern times.

The horse has of course always figured prominently in fiction and romance; but in this connection it will suffice to state the fact that in the Homeric poems of the Trojan war, there is no mention of the trumpet or of cavalry. In Virgil, mounted men, saddles, spurs, and clarions are mentioned. In the romance of "Sir Bevis, of Southampton," he speaks of races of three miles, for "forty pounds of ready golde." Homer knew nothing of horsemen and trumpets in war, while Virgil was familiar with them. The author of "Sir Bevis," in his day and generation probably saw races of long distances, and long-distance races generally precede short ones.

The excellence of the English race horse of the last 100 years is probably more due to the Barb than to any other one strain. It was in 1121 that the first Arabian was imported into England, but the Arabian of that day was not what he was in the centuries 1400, 1500 and 1600, during the time immediately succeeding the overthrow of Charles I. Of English racing horses, Eclipse was the most wonderful of all whose performances have come down to us well authenticated



SHIRE MARE, "QUEEN OF THE SHIRES."

VII. American Thoroughbreds.

The thoroughbred horse of America is of course the descendant of English ancestors. It is probably true that the American thoroughbred is a superior animal to the English thoroughbred; and this opinion is certainly fortified by the triumphs of American horses in England and France, in their greatest races, in the year 1881. A horse transported from one country to another, entirely different in climate, might be pardoned for not performing as well there as he would do at home. Yet, our horses have won laurels in England and France from the very best thoroughbreds there, and in their most exacting races.

In the South, there has always been a passion for the sports of the field, and much attention has been devoted to the breeding of horses of speed and bottom. Interest in fine horses is growing in the North from year to year, but while we have some high-caste breeding studs in the North, the South, and especially Kentucky and Tennessee, still holds the lead. It will not be necessary here to go into a detailed history or description of the American thoroughbred. Importations made before the revolutionary war, and continued from time to time have given us a horse that has no superior on the earth; one that has at last snatched victory from the best of English horses on their own turf. In France, American horses have held their own against the best of English and French thoroughbreds.

VIII. The Arabian.

The Arabians profess to trace the ancestry of their horses back to the time of Solomon, yet in the light of authentic history, their horses before the thirteenth century were not of a character worthy of special notice. The horse of the desert receives the personal care and affection of his master. To the Arab the horse is not only a companion in solitude, but is also his only means of locomotion in arduous and perilous journeys. It is not strange, therefore, that these nomads of the desert should bestow much care upon the breeding and rearing of their horses; and during the past seven centuries, such care has been bestowed. The Arabs undoubtedly did understand the true principle of breeding, care, feeding, selection and training, at a period when Arabia was the seat of learning, and all Europe was enveloped in the gloom of the dark ages, or was just beginning feebly to see the dawn of the revival of letters.

Arabian travelers of the last century do not agree as to the number of distinct breeds of horses in that country. A Mohammedan writer who seems to have had candor, and a good opportunity for gathering facts divides them into six tribes, as follows :

“The Dgelfe, found chiefly in Arabia Felix, seldom seen at Damascus, but common in the neighborhood of Anaze. Horses of this breed are of lofty stature, have narrow chests, but are deep in the girth, and their ears are long. They are remarkable for spirit and fleetness, but are exceedingly tractable, and their ability to endure hunger and thirst is a remarkable feature.

“The Secaloni, a breed from the eastern part of the desert, somewhat inferior to the Dgelfe, though resembling him in most points.

“The Mefki, a handsome horse, but not so fleet as either the Dgelfe or the Secaloni. In figure, he bears a resemblance to the Spanish or Andalusian stock.

“A fourth breed is called the Sabi, similar to the Mefki, but seems to possess no specially useful or striking qualities.

“The Fridi. This breed is very common; but they are often vicious and untrustworthy, and lack some of the excellent qualities possessed by the best of the others.

“The Nejdi, found chiefly in the region of Bussorah. These are said to be at least the equals of the Dgelfe and the Secaloni. Some judges assert that there is no horse to be compared with them, and they stand very high in the market.”

The Dgelfe and Nejdi are reported to be the most valuable. They are known to be the favorites of the horse-fanciers of India, many fine animals of these stocks having been carried thither by the sportsmen of that country.

Other writers make mention of but three distinct breeds, to which they attribute names different from those above given; and it is difficult to reconcile the statements of the two, and to determine whether they have really agreed in any way in pointing out the same animal, though by diverse names, as possessing the striking excellences which have made a certain breed famous and well known to us. Writers of the latter class speak of an inferior race, little esteemed, at home or abroad, which they call the Attechi. These are sometimes found in a wild state. Then come the Kadischi, a sort of half-breed stock, possessing some points of resemblance to the true blood, and being sometimes imposed upon dealers for the genuine. Finally, they describe a superb race, the pure descendants of some extraordinary ancestors, and these they call the Koehlani or Kailhan. The best of them are found among the Shammar and Aneyza tribes. The Arabs themselves pretend to trace the Koehlani back to the days and the stables of Solomon. While this cannot be credited, it is known that some of them have written pedigrees for at least four hundred years, with extreme care, and always on the side of the mare. They are

finely-formed, enduring, fleet, rather small-sized horses of great vivacity and intelligence, but for speed, bottom and physical development decidedly inferior to our thoroughbreds. Yet, though not as swift as the English or American thoroughbred, the Arabian is one of the best of horses. And while we could hardly gain any advantage from a fresh infusion of this blood, the Arabian is king on his native deserts, and no other horse could there fill his place. He is peculiarly adapted to the wants of the people and to the topography of that barren country. So good a horse is he to-day that English residents in India pay from \$700 to \$1,000 for the best that are offered for sale; and it is well known that the best horses of the desert are never sold at any price.



PERCHERON STALLION FRONTON.

CHAPTER VIII.

ABOUT TROTTING HORSES.

1. THE BREEDING OF TROTTERS.—II. PROGENITORS OF FAST TROTTERS—
MESSENGER.—III. IMPORTED BELLFOUNDER.—IV. THE MODERN TROTTER.
—V. WHAT GOLDSMITH MAID WAS LIKE.—VI. THE MOVEMENT IN
TROTTING.—VII. DISUSE OF THE TROTTING FACULTY.—VIII. HIGHLY BRED
HORSES.—IX. STRAINS OF TROTTING BLOOD.

I. The Breeding of Trotters.

The production of trotting horses, like that of racers, has come to be a distinct branch of breeding, and is pursued as a specialty, with a view to developing, in the highest possible form, the best trotting action in the horse. Hence, any person undertaking this branch of the breeder's profession needs to understand the peculiar form to be attained, and also to know the families from which the best trotters have been bred.

The Morgans.—Twenty years ago the trotting form was thought by many to be most strongly developed in the Morgans; at least it was hoped that this breed might be found to possess the qualifications necessary to develop the highest degree of trotting speed. The Morgans, however, disappointed the expectations placed upon them. The records of the turf have proved that fast trotters owe their speed to thorough breeding; and that their speed is directly in proportion to the degree of blood of thoroughbreds of trotting peculiarities that is in their veins.

Ethan Allen.—Ethan Allen, one of the most celebrated of the Morgans, was a good trotter for his day, and yet he was never able to beat Flora Temple. At three years old he trotted a mile, three heats, in 2:42; 2:39 and 2:36 minutes, which was the fastest time then recorded for that age. The false estimate placed upon Morgan horses up to twenty years ago, not only kept back the development of really excellent trotters, but was a positive and incalculable damage to the horses of the country generally, in that it caused the size of the farm animals to be reduced. For the farmers especially went zealously into the rage for possessing Morgan horses.

Development of the Trotting Horse.—The trotting horse of America has been entirely developed within the last forty years. He is not an animal of a separate and distinct breed; for first-rate trotters have come of Canadian or Norman-French blood, from the horses of the middle States of mixed blood, from the Morgans and other New England breeds, and from Western horses of mixed blood.

II. Progenitors of Fast Trotters.

Notable among the horses that have made wonderful records in trotting of late years are those descended from, and partaking largely of the blood of, Messenger, Bellfounder and of Hambletonian. Hambletonian, after a career of varied success as a racer, at length became distinguished as a getter of trotting horses of elegance, finish, speed and endurance, either under the saddle or in harness. It is not our purpose to go minutely into the record of noted performances on the American trotting turf. Nowhere else in the world is the fondness for exhibitions of speed in trotting, so nearly universal among the people, as it has become here; and in no other country are such exhibitions so patronized by every class. Even in Russia, the home of the famous Orloff breed, this sport is by no means a national one. Where the general reader is usually so well informed of current events, the familiar details of exploits upon the turf are deemed to contain far less interest than will be found in a brief account of some of the most celebrated sires, whose descendants have proved constant in their performances.

Messenger.—The original source of our best blood, Imported Messenger, not only gained fame for himself, but bequeathed his excellences to a long line of descendants, who have been famous in the annals of the turf. His own ancestry possessed character for great and peculiar merit. Foaled in 1780, his first sire was Mambrino; second sire, Engineer; third sire, Sampson; fourth sire, Blaze; fifth sire, Flying Childers; sixth sire, The Darley Arabian. On the female side, his dam was by Turf; second dam, the sister of Figurante, was by Regulas; third dam by Bolton Starling; fourth dam, Snaps by Fox; fifth dam, Gipsev by Bay Bolton, and so on through Newcastle Turk, Brierly Turk, Taffolet Barb, to the ninth dam by Place's White Turk, out of a natural Barb mare. Messenger was therefore in-bred to a considerable degree, and combined in his veins the purest and richest blood of early English race horses.

Potency of Arabian Blood.—Godolphin Arabian appears three times in the pedigree of Messenger. Flying Childers was the phenomenon of the English turf in his day, and the accounts of his performances appear almost fabulous. Of one of the progenitors of Messenger, Sampson, it is said that while the thoroughbred of his day was scarcely more than fourteen and a half hands high, rarely reaching fifteen, Sampson was fifteen hands two inches, and was reported to be the largest-boned blood horse then ever bred. Horses of the Sampson blood, as we knew it nearly forty years ago, were wonderfully compact animals of great bone, muscle and sinew. Sampson, Engineer and Mambrino were all rough and coarse, and the last two were considered the strongest and heaviest-boned horses

of the English turf. It was a most lucky circumstance for American studs that a scion of these coarse horses was imported, to stamp his impress upon the thoroughbred of this country. We have found that kind of coarseness to be the embodiment of strength, bone, muscle, and consequently of most enduring speed and bottom.

TROTting STALLION ALLESTON. 2:09 1/4.



III. Imported Bellfounder.

This wonderful animal was known in his day as the Norfolk trotter, and was, like Flying Childers, a phenomenon of the turf. He was fifteen hands high, a bright bay in color, with black legs. Being seven years old at the date of his importation, in 1822, he must have

been foaled in 1815. At five years old he trotted two miles in six minutes, and the next year, trotted nine miles in twenty-nine minutes and thirty-eight seconds. Velocity, his dam, by Haphazard, trotted, in 1806, sixteen miles in an hour, and in 1808 trotted twenty-eight miles in an hour and forty-seven minutes; wonderful work it was for that day, and would be so considered, if performed by a horse of the present time.

Bellfounder's Ancestry.—Bellfounder was not thoroughbred. He was sired by Fireaway out of a Shields mare. The Shields horse, otherwise called "Shales," in England nearly one hundred years ago were hackneys, or, as we would now call them, road and trotting horses. Had the English people cultivated driving, as they did riding, America might not stand unrivalled, as she does to-day, in the pre-eminence of her road and trotting horses.

IV. The Modern Trotter.

Our account of modern trotters would be incomplete if we should wholly omit to mention that wonderful descendant of Hambletonian, Lady Suffolk. Nor must the Morgans be forgotten. The Canadian trotters also claim remembrance; notable among which were those wonderful little pony-horses, many of them not fourteen hands high, known as the St. Laurences, from the name of their sire. The best of them were good for a three-minute gait on the road, before a buggy; for energy, docility, speed and tireless endurance, while drawing the load of a horse, they have seldom been equaled among animals of their size. But it is our purpose more especially to notice the famous trotters of the last twenty years.

Goldsmith Maid and Abdallah.—Among the galaxy of wonderful performers, none surpass Goldsmith Maid. This remarkable mare was foaled in 1857. Her sire was Edsall's Hambletonian, and her dam a mare by old Abdallah. Abdallah was a Hambletonian. In 1862 he became the property of R. A. Alexander, the celebrated Kentucky breeder of thoroughbreds, and was thereafter known as Alexander's Abdallah. Early in 1865, this Abdallah, together with several other valuable horses, among them Bay Chief, a son of Mambrino Chief, was seized by Guerillas. Shortly after, in an attack upon the guerillas by Federal soldiers, Abdallah fell into the hands of one of the attacking party, who refused to give him up. This magnificent stallion, unshod and wholly out of condition for hard service, was nevertheless ridden day after day, over the roughest and hilliest road, until at last, completely exhausted, he was turned loose on the wayside, and died of pneumonia.

Abdallah as a Sire.—To show what might have come of this horse, had he lived, it is only necessary to mention some of his offspring and to note

PACING STALLION, JOE PATCHEN, 2:01 1/4.



what they have done. First is Goldsmith Maid with a record of 2:14; and a further record of 232 heats with 2:30 as the slowest. We also have Mayor Edsall, who made his mile in 2:29; and Wood's Hambletonian,

with sons making records in from 2 : 23 to 2 : 27 $\frac{3}{4}$. Pacing Abdallah, the getter of excellent roadsters, was another of his sons, as was Belmont, the sire of horses going the mile in 2 : 23 $\frac{1}{2}$ to 2 : 30. Again, there is Thern-dale, a compact and muscular stallion, greatly celebrated, not only for his own great speed, but for the excellent trotting qualities of his offspring. In 1876, after serving eight years in the stud, he made five mile heats in 2 : 22 $\frac{3}{4}$; 2 : 22 $\frac{1}{4}$; 2 : 32 $\frac{1}{2}$; 2 : 20 ; 2 : 25. Another remarkable son of Alexander's Abdallah, is Almont. His offspring are yet young to the track, but Piedmont, at four years old, trotted in 2 : 30 $\frac{1}{2}$.

V. What Goldsmith Maid Was Like.

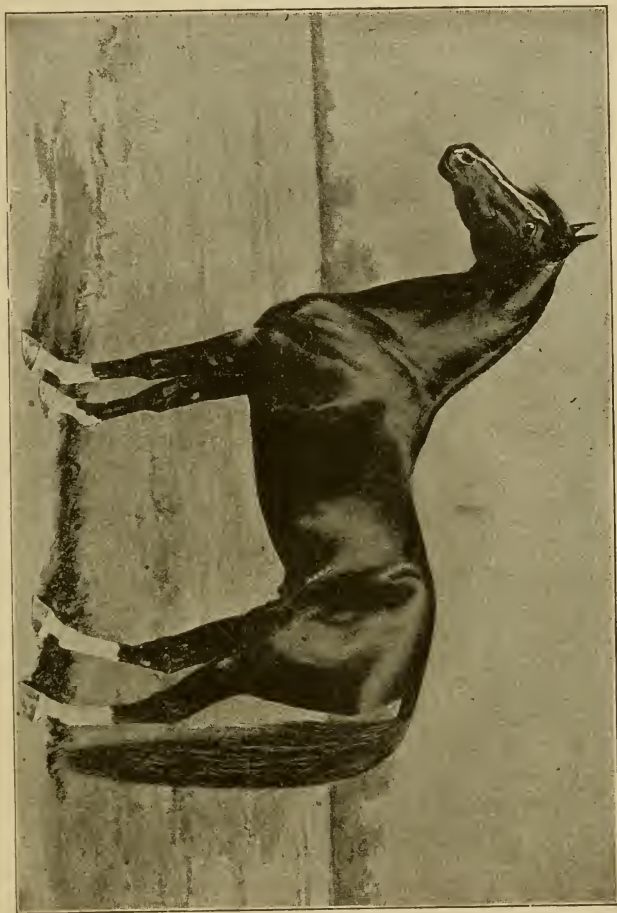
The likeness of Goldsmith Maid shows her appearance, when in trotting condition, and will be studied with interest as an accurate view of the proportions of this most famous and one of the best bred of the Queens of the trotting course. She was fifteen hands and one inch in height, and seems rather delicately made in a superficial examination of her form. Yet the quality of her make-up is in every respect superb.

An accurate and capable writer says of her : "Her head and neck are very clean and blood-like ; her shoulder sloping and well placed ; middle piece tolerably deep at the girth, but so light at the waist as to give her a tucked-up appearance, and one would say a lack of constitution, but for the abundant evidence to the contrary ; loin and coupling good ; quarters of the greyhound order—broad and sinewy ; her limbs are clean, fine-boned and wiry ; feet rather small, but of good quality. She is high mettled and takes an abundance of work without flinching. In her highest trotting form, drawn to an edge, she is almost deer-like in appearance, and when scoring for a start and alive to the emergencies of the race, with her great flashing eye and dilated nostril, she is a perfect picture of animation and living beauty. Her gait is long, bold and sweeping, and she is, in the hands of a driver acquainted with her peculiarities, a perfect piece of machinery. She seldom makes an out-and-out break, but frequently makes a skip, and has been accused of losing nothing in either case. Aside from the distinction of having trotted the fastest mile on record, she also enjoys the honor of making the fastest three consecutive heats ever won in a race, which renders any comments upon her staying qualities unnecessary."

The time of Goldsmith Maid has been beaten several times since 1877, but this detracts nothing from her wonderful performance. She continued on the turf until past twenty years old, and after completing that age she closed her public career with the year 1877 by trotting, during that year, forty-one heats in 2 : 30 or better, and making a time record of

2: 14½. Her record stands at the close of her career at 2: 14, with 332 heats in 2: 30 or better. Her record and her career are the marvel of the age.

TROTTING STALLION JOE YOUNG 2:18.



VI. The Movement in Trotting.

A trotter, especially if he go fast, must go level and square, both before and behind, and with as low action as may be compatible with the necessary stride. It is this ability to go close to the ground, or in what

has been called by some the sling-trot, and by others the slouching trot, of the thoroughbred, that enables the best trotters to make their great speed; the sling-trot is simply the gait in which the animal reaches far forward without raising the feet unnecessarily high, thus economizing time and



PACING STALLION JOHN R. GENTRY 2:00½.

muscle. This movement, at an easy gait, of, say twelve miles an hour, is well displayed in the cut illustrating the trotting movement. It is not an artificial gait, as has been stated by some good English horsemen. Every one who has reared a well-bred colt has seen it, when following the dam, strike naturally into this gait, with head up and tail

straight out. The trot is a natural gait of any horse, and is always used when going at easy speed on a smooth surface; but the best trotting action is the result of breeding and training.

VII. Disuse of the Trotting Faculty.

That the English blood-horse has lost the trotting faculty to a great extent, is not because it was never in the blood, but because it was never allowed to be exercised in the training. And, as few horses could ever gallop fast or far, without special training, so, no horse can trot to the best advantage unless the gait has been developed by long practice; and it is a peculiarity of this gait that the trotting horse, unlike the runner, seldom arrives at his best, until he is over eight years old. The same rule will apply to fast walking horses. They must be specially trained to walk fast, and there is no better preparation for the trotting horse than this preliminary training in walking.

VIII. Highly Bred Driving and Saddle Horses.

Within the last ten years, the Hackneys have come to find a prominent place among American driving horses. These horses may also be trained to jump either from a standstill or when extended. They have come to be considered as excellent ponies for polo playing, and, as now bred, their fine turn of speed makes them available for light driving.

Testing Horses as Roadsters—So again trotting horses of good style, but not fast enough for the track, make admirable roadsters and general drivers. They are also available for light express wagon work and other similar purposes where speediness is necessary. The farmer who likes to breed this class of horses, that will make good sellers at fair prices, may get them out of stylish roomy mares, from staunch sires of trotting blood. This class of horses will also be found available for general farm use, but if intended for the uses described, should not be used for the heavier uses of the farm, but three abreast will do a deal of plowing without injury.

The New Morgans.—The Morgans can not hold their own to-day as against the English Hackney, the trotting horse or Kentucky saddle horse as now bred. The palpable reason is that we want size with stamina now. This we get with a number of fashionably bred horses—Hackneys, trotters, saddlers, French Coach and even thoroughbreds, not quite stylish enough for high priced carriage, coach, trap and other uses, all of which sell well as roadsters, light express, general delivery teams, drivers and cavalry horses.

Saddlers.—Another class that always sells well both for home use and export. They also make wonderfully fine cavalry horses. There are two classes of these—one, the saddler *per se*, and the combined saddle and carriage horse; the latter is a good general-purpose horse for running to

town with a light load; will do a good job in light plowing or for chasing around. The Kentucky saddle horse should be used for the saddle exclusively, and if well bred is a good horse for export.

Market Classes and Grades of Horses and Mules.

Believing that "market classes of horses are not well understood, and that a clear setting forth of true market standards will do much toward establishing correct ideals on the part of the horse breeder and producer," R. C. Obrecht, of the Illinois Station, has made an investigation of Chicago and St. Louis horse markets, which are considered similar to other markets of note, with a view to clearly defining market classes and grades of horses and mules. The first fact of importance brought out by this investigation is that the majority of horses which find their way to the large markets do not approach the degree of perfection demanded by the intending purchaser.

A correct understanding of the market classes will enable the farmer to form a better estimate of the value of the horses which he has to sell; for without this the farmer is at a decided disadvantage in selling his horses, not knowing their real market value. In this way he may fail to get what his horses are worth or he may lose a sale by asking too much. Again it often happens that he fails to distinguish clearly between his good and his poor marketable animals. As a result the dealer takes the desirable ones at a good profit and leaves the undesirable; thus the inferior horses are left in the country to become the parent stock.

To form an intelligent estimate of the value of horses or mules, therefore, it is necessary to have a thorough understanding of the market requirements and a correct understanding of the market classes and grades.

The principal factors that determine the market value of horses or mules are: Soundness, conformation, quality, condition, action, age, color, education, and general appearance.

Horses or mules of a general type are grouped into classes, for convenience and a definite understanding; and in most instances the names of the classes are suggestive of the use to which they are put. The classes of horses are divided into subclasses which embody those of a similar type but slightly different in size, weight, action, or the use to which they are put. Mules are not divided into subclasses.

The market classes are: Draft horses, chunks, wagon horses, carriage horses, road horses, saddle horses, mining mules, cotton mules, sugar mules, farm mules, and draft mules.

Horses.—Draft horses are broad, massive, rugged, and compactly built, with great weight and strength. They stand from 15-3 to 17-2 hands high and in good flesh weigh from 1,600 to 2,200 pounds or



PERCHERON HORSES.
Many Times Prize Winners.—Specially photographed for this work.

more. The class is subdivided into light draft, heavy draft and loggers.

Chunks are short-legged, broad, heavy-set horses, the name of the class being indicative of their conformation. The subclasses are eastern or export, farm and southern. The class varies in weight from 800 pounds, the lightest of the southern, to 1,550 pounds, the heaviest of the eastern. They stand from 15 to 15-3 hands high.

Wagon horses are those used principally where business requires quick delivery. They must have good action, a clean set of limbs, good feet and bone with an abundance of quality, be closely coupled, compactly built and have a deep broad chest indicative of constitution and stamina. In this class are express, delivery wagon, artillery and fire horses. They stand from 15 to 17-2 hands high and weigh from 1,050 for the light weights of artillery horses to 1,700 pounds for heavy fire horses.

Carriage horses, sometimes spoken of as "heavy harness horses," are full made, round bodied and smoothly turned with an unusual amount of quality, and must possess to a marked degree high action, with a fair amount of speed. They should have a long, well-arched neck, small neat head, a short, well-muscled back, long, level croup, and well-developed thighs and quarters. The class is comprised of coach, cob, park, and cab horses. They range in height from 14-1 to 16-1 hands and weigh from 900 to 1,250 pounds.

Road horses are more lithe in build and angular in form than those of the carriage class. They are sometimes spoken of as drivers or "light harness horses" and are usually driven to light-weight vehicles. A considerable speed is desired of some of the individuals of this class, which is composed of runabout and roadsters. They range in height from 14-3 to 16 hands and weigh from 900 to 1,150 pounds.

Saddle Horses. —In this class are grouped those horses that perform their work under the saddle, the requirements for which are sureness of foot, ease of carriage to the rider, good manners, and ease of control. In order to be sure of foot they must have an oblique shoulder, high thin withers and a properly set pastern with an abundance of energy. The above qualities together with a short strong back will give strength for carrying weight and also an easy gait. The minimum height is 14 hands for a polo pony and the maximum 16-1 hands for hunters. The weight varies from 850 to 1,250 pounds. Grouped in this class are five-gaited saddlers, three-gaited saddlers, hunters, cavalry horses, and polo ponies.

Mules. —Mining mules are those purchased with which to operate mines. They are heavy boned, rugged, compactly built individuals, with large feet and strong constitution. They range in height from 12 to 16 hands and weigh from 600 to 1,350 pounds.

Cotton mules are lighter boned than miners and not so compactly built. They are round bodied, smoothly turned, and possess considerable

quality. They range in height from 13-2 to 15-2 hands and weigh from 750 to 1,100 pounds.

Sugar mules are those shipped south to use on the sugar farms of Georgia, Louisiana, and other Southern States. They are taller, larger, and more breedy looking than cotton mules and have heavier bone. They stand from 16 to 17 hands and weigh from 1,150 to 1,300 pounds.

Farm mules are those purchased to be used on the farms of the Central States. They are somewhat lacking in uniformity of type and many of them are young and somewhat thin in flesh. An average height is from 15-2 to 16 hands and weigh from 900 to 1,250 pounds.

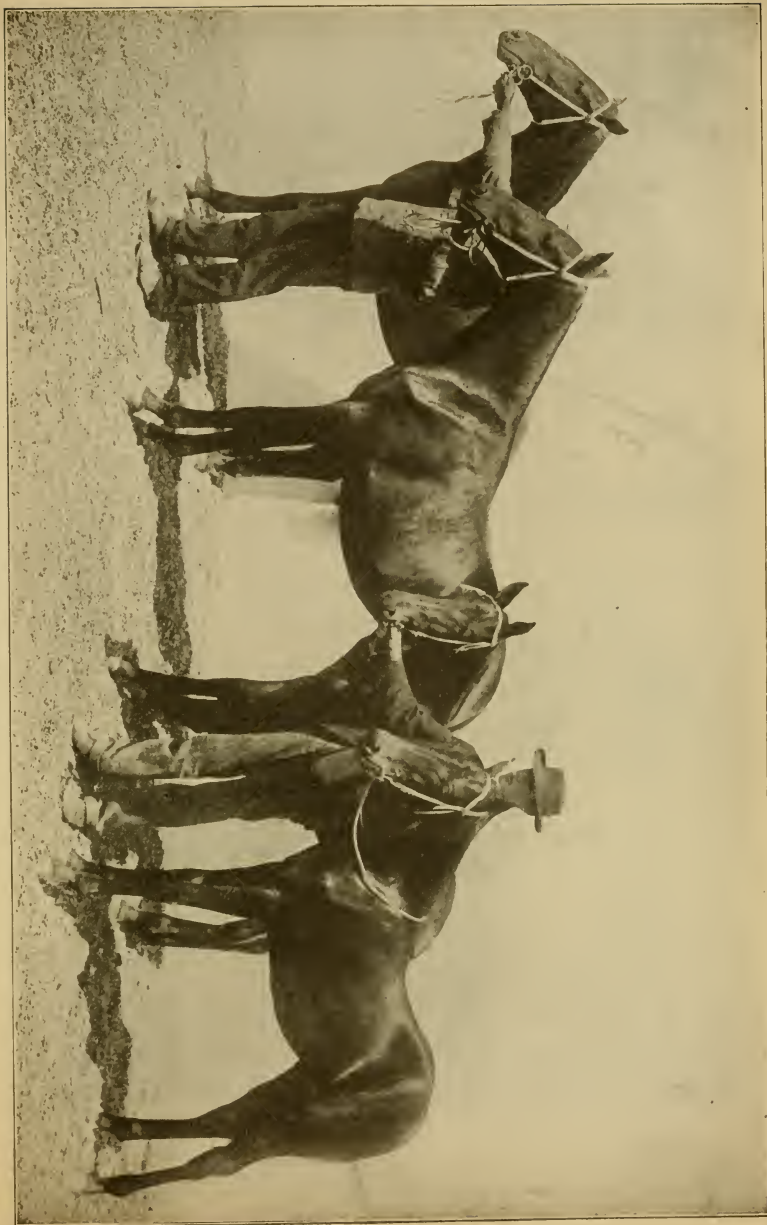
Draft mules are large heavy boned, heavy set mules that possess quality and ruggedness. They are used in cities for heavy teaming and by contractors for all kinds of heavy work, such as railroad grading, etc. They range in height from 16 to 17-2 hands and weigh from 1,200 to 1,600 pounds and upward.

The grades distinguish the good from the poor animals within the classes and subclasses. The grades are choice, good, medium, common, and inferior.

An animal to grade as "choice" must be sound and approach the ideal type, possess quality and finish, have good style and action, and be in good condition. A "good" animal should possess the essential qualities of his class but need not have the quality, condition, and finish necessary to grade as choice. A horse or mule of "medium" grade is likely to be plain in his make-up with a tendency toward coarseness, and somewhat of a lack of symmetry and condition. A lack of style, action, or soundness may also cause him to grade as medium. The lowest grade found in many of the classes is "common." Such individuals are wanting in most of the essential qualities that go to make them desirable. An "inferior" animal is of the lowest possible grade.

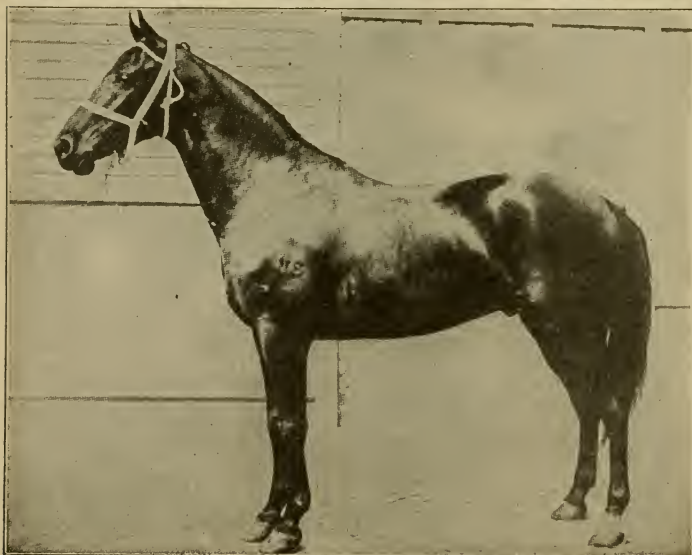
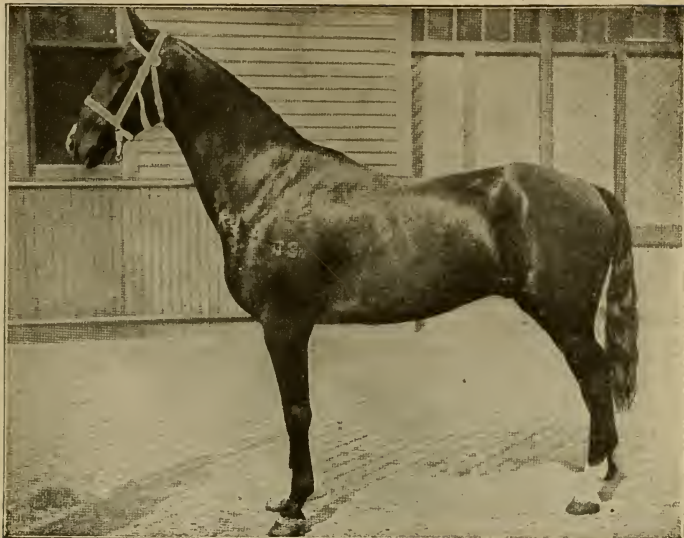
Owing to the fact that the point where two classes or grades meet and merge into each other is not always distinct, it is sometimes difficult to say just where certain animals that are not clearly typical should be classified. Again, if the demand exceeds the supply it is sometimes necessary to temporarily draw from a similar class of animals, or the price may advance and in this way equalize the demand. If, on account of a meager demand or an excess supply the price should drop, it is sometimes necessary to place some animals of one class in another, i. e., they will be purchased by a different class of trade.

The breed to which a horse belongs has but little influence upon his market value and the classes are not determined by the breeds, but by the individuality and conformation of the horse; however, a judicious use of choice pure-bred sires is best suited for the production of marketable horses.



PURE BRED MORGAN COLTS

Specially photographed for this work.



TWO CHOICE CAVALRY HORSES SELECTED FOR THE U. S. ARMY.

These horses meet the government specifications for a cavalry horse, to-wit: must be sound, well bred, of a superior class, and have quality; gentle and of a kind disposition; thoroughly broken to the saddle, with light and elastic mouth, easy gaits, and free and prompt action at the walk, trot and gallop; free from vicious habits, without material blemish or defect, and a gelding of uniform and hardy color, in good condition; from 4 to 8 years old, weighing from 950 to 1100 pounds. Height, 15 to 15-3 hands.

IX. Strains of Trotting Blood.

That the trotting horse of America owes his great powers to the infusion of thorough blood, we have before stated. To Imported Messenger is this due in the greatest degree. Another great trotting sire of America was Imported Bellfounder. There has been much controversy over his breeding, first and last, but that he was a staunch trotter and a getter of admirable horses, there is no doubt, giving splendid action to his get. Still, it must be admitted that, admirable as was Bellfounder himself, his get was not equal to the descendants of Messenger in all that constitutes speed, endurance and action.

Duroc also became a valuable factor in our trotting blood. His strain of blood appears in the Medley's, Duroc Messenger's Mambrino Chief's and Gold Dust's.

One of the sub-families of Messenger's blood, Hambletonian, who united the blood of Messenger and Bellfounder, has raised the trotting horse of America to the highest point of perfection. He was not a handsome horse from a thoroughbred standpoint, if indeed he was thoroughbred, which has been doubted. His pedigree has been given as follows: Hambletonian was by Abdallah; he by Mambrino, a son of Messenger. The dam of Abdallah was the mare Amazonian. The dam of Hambletonian was by Imported Bellfounder; second dam by Hambletonian; third dam, Silvertail, said to have been by Imported Messenger.

In all that constitutes stoutness and ability to perform, in freedom from tendency to disability, his stock has been wonderful. Noted for immense and strong joints, length and strength of bone, magnificent muscular development, prominent, square, massive build, mighty hips and excellent barrel, all knit together to form a most admirable frame, united to a nervous constitution that reproduced itself in his descendants, in a most wonderful degree.

In relation to the descendants of the progenitors of the strains of trotting blood, Mr. H. T. Helm, in his work, "American Roadsters and Trotting Horses," says of the trotting horse of to-day: "The combined Abdallah-Bellfounder is a horse of the teens; Goldsmith Maid, 2:14; Dexter, 2:17; Gloster, 2:17; Bodine, 2:19½; St. Julian, 2:22½; Gazelle, 2:21; Fullerton, 2:18; Mountain Boy, 2:20½; Jay Gould, 2:21½; Nettie, 2:18; Startle—. Joe Elliot would, in his opinion, have stood as a bright star in the firmament." We can add to this our own opinion as a breeder of descendants of Messenger and Bellfounder many years ago, that we never had a disappointing colt. They were mighty driving horses, of great bone, muscle and sinew, of great lung power, and, of course, of great endurance.

CHAPTER IX.

THE BREEDING AND REARING OF COLTS.

I. IMPORTANCE OF ACCURATE KNOWLEDGE.—II. BREED FROM MATURE ANIMALS.—III. NO PROFIT IN INFERIOR HORSES.—IV. HEREDITY IN ANIMALS.—V. PECULIAR ORGANIC STRUCTURE.—VI. HEREDITY OF DISEASE.—VII. AVATISM OR BREEDING BACK.—BREED TO NONE BUT THE BEST.—VIII. VARIATION AND DEVELOPMENT.—IX. TRANSMISSION OF QUALITIES.—X. THE IMPRESS OF COLOR AND FORM.—XI. RELATION OF SIZE IN SIRE AND DAM.—XII. BREED ONLY FROM PURE SIRES.—XIII. THE BEST ARE CHEAPEST IN THE END.—XIV. SELECTION OF STALLION AND MARE.—XV. SERVICE OF THE STALLION.—XVI. THE PERIOD OF GESTATION—TREATMENT.—XVII. TREATMENT AFTER FOALING.—XVIII. HOW TO KNOW IF A MARE IS IN FOAL.—XIX. HOW TO KNOW THE FOALING TIME.—XX. THE FOALING STALL.—XXI. ABORTION, OR SLINKING THE FETUS.—XXII. HOW TO RAISE A COLT.

I. Importance of Accurate Knowledge.

The breeding and raising of farm stock is one of the most interesting branches of agricultural art, and it is one requiring judgment and accurate knowledge in a high degree. In the preceding chapters we have therefore, carefully gone over the ground covered by what pertains to the anatomy and physical condition of the horse, to the end that any intelligent person may become so thoroughly master of the subject that he may not only know what constitutes a good horse, but may also decide with tolerable accuracy as to the age and constitutional vigor of an animal, and be familiar with the characteristics of the principal breeds.

Know what You Breed For.—A horse should be bred with a view solely to the labor he is to perform. The first thing for the breeder to do, therefore, is to decide what he wants with the horse. If the animal is intended for the turf, there is but one course to pursue; breed only to horses of the most approved pedigree, for the distance, whether it be one, two, three, or four miles. It is well known that but a moiety of the colts, even of the best blood, ever arrive at high eminence. So many are the contingencies to be met, and so many the risks to be taken, that our advice is, Do not undertake the breeding of this kind of stock, unless you are amply able to provide all the varied requirements, including the most perfect stables, and a training track. Above all, do not waste money on the so-called thoroughbreds, that travel country districts, expecting to breed high-priced horses from common mares. You would be quite as likely to be struck by lightning as to succeed in getting anything better, from such parents, than a quarter nag for a scrub race. So with trotting horses, do not expect to get a crack trotter unless the blood of trotting thoroughbreds is strong in the veins of sire and dam. Nor can you get a fine carriage driving horse from some weedy, dancing,



PONY STALLION, SIR HORACE.

high headed sire, whose nervousness comes from timidity, and whose blood is made up from guess-work breeding. Read carefully what is contained in the preceding chapters, and breed from stock, already improved, rather than seek to make a breed yourself.

If you desire to breed up from the stock you already have, the object is a laudable one, provided you want horses only for general use. In this case, breed from the best sires you can find, and those which combine the characteristics you seek to perpetuate.

II. Breed From Mature Animals.

Maturity in breeding stock is indispensable, since it is futile to expect to get the best development from animals undeveloped themselves. We believe the weediness of many thoroughbreds, which means want of development and lack of constitutional vigor, to be the result, in part, of too early and fast work, and also of breeding their parents while yet too young, or after they were broken down for service on the turf. To get the highest excellence in the offspring we must have the highest development in the parents. Degeneration will surely result, if we breed from immature or broken down animals. Another important requisite is, that the sire be given plenty of exercise during the season of service; and after that, and until the next season begins, he should have constant work, except for a period of rest with a run on the grass immediately after the service season. The mare also should not be idle, nor confined to the stable; exercise is as necessary to the dam as to the sire.

III. No Profit in Inferior Horses.

The best and purest stock, well adapted to the end sought, is always the cheapest. This is a fundamental principle, to be kept constantly in view. It costs no more to feed, shelter, and properly care for good stock, than it does to feed, shelter and care for inferior stock. The first cost of good animals is, of course, more, but this is the capital invested, and for which you expect to get adequate returns. It costs no more to raise good stock than it does to raise inferior stock. It costs no more to fit and train the one than the other. After you have secured the female stock, smooth in movement, of undoubted constitutional vigor, and of the proper blood for the labor intended, if you do not own, or cannot afford to own, the sire, you need not fear to pay liberally for such blood as you require; you may, moreover, safely incur the expense of sending your mares considerable distances to procure the proper sire. This, however, will rarely be necessary unless you wish exceptional colts; for, in all well-settled districts, there are plenty of good sires, outside of the highest-caste thoroughbreds, and trotting strains. In thinly-settled districts the breeding of high-caste stock should not be undertaken unless the

breeder can afford to keep the sires at his own expense or by co-operation, or in partnership, with others.

Taking it for granted that the reader accepts, as true, the foregoing propositions, we will next inquire into some points that should be borne in mind by every one who hopes to win success as a breeder, whether from the stand-point of profit or with a view to the pleasure of doing a thing well.

IV. Heredity in Animals.

We have dwelt with some emphasis upon the importance of breeding from sound, vigorous parents; for like produces like, and the rule is constant even in the case of phenomenal animals. Extraordinary development is by no means the result of chance, though it may be the bringing out in an extraordinary degree, of qualities that have been dormant, perhaps for generations, for the want of what breeders call nicking. By "nicking" is meant the development of dormant traits through the union of a sire and dam of peculiar qualities, of the most excellent traits perfectly blended together, and conferring vigor of constitution, soundness and fineness of bone, along with great muscular development, good digestion and excellence of the respiratory organs, and of the nervous system, and nerve force. With these, an animal must be good; and how to have them good is the object of this work.

Let us now see what goes to make up that quality called heredity, which is carried in the breeding of an animal. Charles Darwin has written voluminously and conclusively on this subject, as have many others. Dr. Miles, late professor of Agriculture in the Michigan State Agricultural College, in a treatise on the laws of development and heredity, in relation to the improvement and breeding of domestic animals, has collected and arranged much valuable matter bearing upon this subject; and he cites heredity of normal characteristics, atavism, variation, the relative influence of parents, influence of previous impregnations, and various other matters, as being well worth the study of the breeder. The position we have assumed is, therefore, founded upon correct and long-continued observation by the most eminent minds of this and other ages; for more than a glimmering of the laws of heredity was had even by the ancients. In classic times there were families of athletes among the Greeks; and the extract already given from Xenophon shows that he no less understood what a horse should be, than he did how to conduct the memorable retreat of the ten thousand, and to fight successful battles. Later researches by Galton have shown that the best wrestlers and oarsmen belong to a small number of families in which strength and skill have become hereditary. The most successful of our trotting horses are

derived from three families ; of these the descendants of Messenger are most strongly marked in hereditary trotting qualities. Among running horses Eclipse begat 334, and Herod 497 winners. The hereditary transmission of strongly marked peculiarities in races is conspicuously shown in the Jews and in the Gypsies, who intermarry, each, only, among their own race. Hence, says Ribot, "their distinguishing characteristics have remained the same for centuries." So, certain breeds of sheep, as the Spanish Merinos, certain breeds of cattle, as the Devons, like certain breeds of horses, are strongly characterized by their hereditary traits and tendencies.

V. Peculiar Organic Structure.

No less remarkable is the tendency, sometimes seen, to inherit abnormal organic structure. A peculiar structure of the ear, nervous system and vocal organs, gave to the family of Sebastian Bach, that power which in eight generations produced no less than twenty-nine eminent singers. Fecundity, length of life, abnormal peculiarities of members of the body, day-blindness, total blindness, peculiar forms of infirmity, and of disease, are well known to be hereditary in some human families. According to Finley Dun a tendency to consumption and dysentery in cattle is indicated by certain well marked signs ; the most obvious of which, he says, are a thin and long carcass, narrow loins and chest, flat ribs, a hollow appearance at the flanks, extreme thinness and fineness of the neck and withers, hollowness behind the ears, fullness under the jaws and a small, narrow muzzle. All these are indications of defective nutrition, and will apply generally, not only to cattle, but to other animals ; and defective nutrition is the parent of disease.

VI. Heredity of Disease.

Of 1000 cases of insanity noted in France, 530 were hereditary. In the family of Le Compt, thirty-seven children and grand-children became blind like himself, and in this case the blindness, for three successive generations, occurred at about the age of seventeen or eighteen years.

Blindness is well known to be hereditary in horses. Spavins, curbs, ring-bones, strains of the back tendons, swelling of the legs and grease, roaring, thick wind, chronic cough, partial as well as total blindness, malignant and other tumors, epilepsy and various nervous affections, are also distinctly hereditary in the horse, and often do not appear until mature age. Hence, it is necessary to know that the stock you breed from is not only sound, but that it came of sound ancestry ; for disabilities may be dormant for one, two or three generations, and then appear.

The predisposition most to be guarded against in horses, is hereditary disability in the bone, sinew, viscera, and especially in the sight. Defective sight leads to shying, fright and consequent unmanageability, and is therefore dangerous in the extreme.

VII. Atavism or Breeding Back.

In breeding, if an abnormal characteristic appears in any of the young, and this is found to be valuable, it should be sedulously preserved and fostered. What is called breeding back or throwing back, may occur after the lapse of many years. The occasional appearance of horns in Galloway cattle is a case in point. Mr. Darwin mentions the occurrence in two of a litter of Essex pigs, of marks of a Berkshire cross, that had lain dormant for twenty-eight years. The reproduction of a peculiarity of an ancestor, near or remote, whether of form, color, mental trait or predisposition to disease, is termed atavism. It is a valuable trait when good qualities are thrown, and they are likely to be, if the good qualities are inherent. It is to be guarded against, if the qualities transmitted are bad. Hence we have laid it down as a rule: Breed to none but the best.

VIII. Variation and Development.

Variation is among the rarest of the occurrences that the breeder ever encounters. It is in fact not susceptible of proof that distinct and well-marked variation of a race is possible. Its occurrence is probably due to the throwing back to some long dormant quality of a remote ancestor. Wild animals do not change; among them one is like the others. If transported, they may be dwarfed in size, and acquire a more abundant covering of hair, while their stomachs and other organs may become modified to suit the changed conditions in a rigorous climate, or, with warmth and abundant food they may be increased in size and general development. But this is not what we understand by variation, which is not some sudden change in the species. Variation is rather the departure of the individual from the well-known traits of his species or family, and is due, as already stated, to atavism or breeding back to some ancient ancestor, and to some remote cross or mingling of blood. Species may acquire certain traits by development, but the process is gradual, and when once attained the traits may be perpetuated. This development is most gradual in horses, somewhat quicker in cattle, yet faster in sheep, and still more so in swine. Horses breed but once a year, mature the most slowly of all farm animals, and rarely produce more than one young at a birth. Cattle mature faster, breed younger and frequently produce twins. Sheep mature still faster, and often produce two or more at a birth, while swine mature rapidly, breed young, and produce many at a birth.

IX. Transmission of Qualities.

In breeding, there are two points to be taken into consideration, in relation to the transmission of the qualities of the sire and dam. As a rule the sire of pure blood, coupled with a "cold-blooded" mare, by which we mean a mare of mixed blood, will get a foal more strongly resembling himself than the mare. Some sires have this power of impressing their characteristics upon the progeny in a remarkable degree. A fact that is still more striking is that some females have the faculty of bringing young remarkably like the sire. This is a species of atavism. If a mare possesses this peculiarity, she is invaluable, and if of pure blood should never be served by any but the best sires. If of cold blood then she should be served by a sire of like peculiarity as to the transmission of blood, and possessing the qualities which are wanted in the foal. Again, the oftener a female is served by the same sire, the stronger will be the likeness of the progeny to the sire, as a rule; and the oftener the sire is changed, the greater will be the danger of variation in the progeny. Hence, the absolute importance of breeding in such manner that the blood sought will be more and more impressed with the characteristics required; and, hence, again, the imperative necessity that the first time a female, especially one of pure lineage, is allowed to breed, it be not only to an animal of known purity of blood, but to one bred in the same line, that is, having the same qualities as herself; for, not only is the dam impressed with the blood of every sire with which she has had contact, but the first impress is stronger than any succeeding one. It is not necessary here to go into a demonstration of these facts. They are so well established that they may be taken for granted.

X. The Impress of Color and Form.

Breeding to color is also an important point to be considered. Never use a parti-colored stallion, but always use one of self-color. Bays and chestnuts with darker manes and tails are the best colors, as a rule. These colors may be broken with white at the fetlocks, and by a star in the forehead; but too much white should be avoided, while "calico markings" are the least desirable of all. Certain breeds have characteristic colors, as the gray in the Percheron, bays and browns in the Clydesdales, and black in the English cart horse. Adhere to definite colors, whatever they may be; if others incline to crop out, especially marked ones, be sure they are due to atavism, from some near or remote cross.

With regard to form, the rule more generally acknowledged to be correct, and the one borne out by many facts, is, that the sire impresses outward form and color to a great degree, and the mare the inner and physical form to a corresponding degree. If the sire be of the purest

lineage, his impress, all through, will be the stronger, and if the mare be the purest, her characteristics will predominate. In breeding up to a higher standard, be sure, therefore, that the sire is of the purest and the most strongly marked characteristics, as to impress of blood.

XI. Relation of Size in Sire and Dam.

In the production of full-formed, vigorous and symmetrical animals, it is desired to increase the size, the mare should be relatively larger than the horse. But if the size is correct, according to the breed, select sire and dam of relative size; that is, select a sire proportionately larger than the dam, according to the breed. In Devon and Hereford cattle, for example, the cows are smaller than the bulls, wherein they contrast with the Short-Horns, where the relative size between male and female corresponds more nearly with the relative size of horse and mare. Above all, never make the mistake of attempting to breed-up the size by using overgrown males. Such an experiment must always end in disaster, as many farmers have found by breeding small mares, which they happen to have, to some coarse, large-boned horse, with the idea of getting large, able-bodied colts. At the time when overgrown horses were fashionable in England, for coach and carriage teams, the farmers of Yorkshire attempted to breed such animals from overgrown stallions on small mares. The result was a dismal failure. The converse of this has been seen in this country, in breeding pony Morgans upon much of the farm stock with a view of getting fine horses. The outcome was stock too small for labor, and not good enough for anything like road horses. The results of this mistake may yet be seen in some parts of the country, in undersized animals.

XII. Breed Only From Pure Sires.

In-and-in breeding, as already stated, as the breeding together of animals closely related, as the progeny of one sire and dam or members of the same distinct and closely related lineage. Cross breeding is the union of two distinct sub-families of the same tribe. Hybrids are the produce of two distinct tribes of a family, as for instance in the *genus equus*, of the mare and ass, or the mare and zebra, or of the mare and quagga. Cross-bred animals are fertile; hybrids are not. Breeding in line is the union of animals closely enough related to possess similar characteristics. In this connection it will be sufficient to state conclusions founded upon experience and facts. The data may be found in the records of herd and stud books, and in works dealing in specialties relating to physiology, anatomy and breeding.

If it be desired to keep a stock absolutely pure, and to retain the well-known characteristics of a breed in their best form, the proper plan is to

breed to line with individuals having the distinct points required. If the object is to breed-up, to found a breed, or to refine certain points and characteristics with a view to their perpetuation, it will be safe to breed in-and-in, or closely, for three generations, and then take an out



A CHOICE ROADSTER AND MANY TIMES A CHAMPION.

Note the unusual length of body and rangy conformation. Note, also, the unusual length from hip to hock and well muscled thighs and quarters indicating speed qualities. Height, 15-3 hands; weight 1150 pounds.

Good roadsters stand from 15 to 16 hands high and weigh from 900 to 1150 pounds. While 16 hands is the upper limit for this class, a 16-hand roadster is not nearly so desirable as one that does not stand more than 15-3 hands high. Some authorities go so far as to say that a 16-hand horse is not wanted; however, if the extra height is all that is against him, he usually finds a buyer without great difficulty.

cross, or breed to line, as the case may be. For ordinary purposes, where stamina, strength of constitution, and not exceptionally constant characteristics are required, crossing is not objectionable, though violent crosses, as heretofore stated, must not be allowed. Breed your females to the best male you can find, having due regard always to the point that the

female must not be bred to a male widely different from herself. Good mares of the common mixed breed may be bred to staunch thoroughbreds to refine, and to give style, symmetry and speed to the foals; to Percherons, or Clydesdales, to increase the size and strength for draft; to the Cleveland Bay, to beget handsome, able horses for the farm and carriage, and to well-bred trotting stock to get good horses for the road, and for all work.

An historic animal strikingly illustrating our meaning was the widely celebrated horse Gold Dust, a horse of mixed blood, got by Vermont Morgan, out of a dam nearly or quite thoroughbred, it will serve to show a result of cross breeding. The progeny partakes more of the thorough than of the mixed blood. The famous Shales, a half-bred horse foaled in England, early in the century, and noted during his whole life as a most wonderful trotter, shows the result of a thoroughbred sire, with a dam of mixed lineage. Here the preponderance is in favor of the thoroughbred sire. The noted Dervish shows an example of pure breeding, and probably of close, or at least line, breeding. He was a little bay Arab, of great style and fineness, remarkable for his darting, square trot; that is, for throwing out the fore-leg, and straightening the knee before the foot touched the ground.

VIII. The Best are Cheapest in the End.

The highly-bred trotters of to-day, those quite or nearly thoroughbred, show the value of breeding in line, that is, we repeat, the breeding together of animals of close descent, or those having characteristics in common. Many of our best thoroughbred racers show examples of in-and-in breeding, and, as a rule, those bred in the same line of descent are more uniform in their qualities, than those which have been produced by the union of many sub-families of the same original blood. The objection to close in-and-in breeding is, that, if persisted in, it will ultimately result in weakening the constitution, while at the same time it refines. To establish a breed it must be closely followed, departing from the rule only when undue delicacy of constitutional vigor is feared. In the wild state, gregarious animals, such as horses and cattle, breed in-and-in for two or three generations, or until the strongest males become enfeebled with age, or are obliged to succumb to younger and more vigorous ones; which is in accordance with the principle of the survival of the fittest, and may be called a modification of in-and-in breeding alternated with breeding to line. The same rule would be a sound one, if modified by careful selection, in the artificial breeding of domestic animals, always keeping in mind that in sheep, and especially in swine, the rule must not be so closely followed. But in all this, remember constantly that the

best are always cheapest in the end. It is true that the breeder's purse must be considered ; but, be he rich or poor, it is always a money-losing business to breed to an ill-formed male because he is cheap.

XIV. Selection of Stallion and Mare:

The selection of the stallion, while it will depend primarily upon what the colts are intended for, should always be for the good there is in him. He should be of full medium-size for the breed, and should possess the characteristics we have previously stated, in writing of breeds. He should be masculine in every fiber, with the distinguishing beauty, strength, fire and courage of the male. Never breed to a feminine-looking male. The outcome will always be a failure.

Selection of the Mare.—The selection of the mare is no less important. It is she that is to nourish the fœtus, and after birth give suck to the young. The mare, whatever her size, should not be coarse at any point. Her beauty needs to be feminine, just as that of the stallion must be masculine. She should carry more muscle or flesh than the horse, be more rounded in outline, but be finer in head, neck and limb, and thinner in mane and tail than the stallion. Her strength should be that of fleetness, her fire that of docile playfulness, and her courage that of ambition to perform. She should have a larger pelvis, relatively, than the horse, and her barrel should be rather rounder and more roomy. Her milking qualities should of course be good, for upon them depends, in a great measure, the future usefulness of the colt.

XV. Service of the Stallion.

The mare may be served just as she is coming into heat, but better just after her greatest passion of heat has passed. The best time for service is early in the morning. After being served let her remain quiet, or, if she seem fretful, walk her slowly about, and, after fifteen minutes, turn her into a pasture that she may amuse herself eating grass ; but not in a pasture where there is other stock. A mare will usually receive the horse on the eighth or ninth day after foaling, even though she exhibit no particular sign of heat ; if not, she may come into heat when the colt is about four weeks old.

Treatment after Service.—After being served, try her with the horse on the ninth day ; if she refuse, try her again on the seventh day following ; upon a second refusal, try her again on the fifth day after that ; if she then refuse, she may be fairly conceded to be with foal. Above all things, the mare should be kept away from teasing horses ; from badly castrated geldings ; from ridglings, or horses imperfectly gelded, and bearing one testicle in the body ; from yearling colts, and from other mares in heat. When once the time of heat is known, and service given, the

mare should be returned to the horse as recommended, so that the time may not run over when the mare should receive the horse. Forty-four weeks being the usual time the mare goes with foal, if the service of the stallion is delayed it will bring the birth of the next foal too late, perhaps, in the next year; and, possibly one year may have to be intermitted in breeding.

XVI. The Period of Gestation.

Gestation, the carrying of the young, continues, on an average, eleven months or forty-four weeks. This period may, however, according to the observations of Mr. Youatt, be diminished by five weeks, or extended by six weeks. Thus it will be seen that there is a variation of nearly eleven weeks, or nearly three months. M. Fessier, a French observer, counting 582 mares, finds the longest period 419 days, the shortest 287 days and the average 330 days. In an observation by M. Gayot on twenty-five mares, the average was 343 days, the longest period 367 days and the shortest period 324 days. Small mares, as a rule, go a shorter time than large ones, and a mare is apt to carry a horse colt longer than one which is a female. The observations of M. Fessier may be taken as the most conclusive, since they were extended over a period of forty years.

Treatment During Gestation.—The mare should not be worked immediately after being served. Once quieted, it is proper that she have ordinary work until within about three months of the time of foaling. After this she may do light work, not fast work, with benefit to herself and the foal. Care, however, must be taken that she do not slip or strain herself, nor fall down.

XVII. Treatment After Foaling:

After foaling, and until the colt is a month old, the mare should do no work. In fact, no valuable mare should do any work, certainly not more than enough for exercise, until the colt begins to eat grass and grain freely. There are more colts dwarfed, and mares injured, by the dam being worked hard while suckling the colt, than at any other time, and by all other means whatever. She is then weak, liable to become overheated, and any disability experienced by the mare will surely be participated in by the foal.

XVIII. How to Know if a Mare is in Foal.

As already stated, if the mare refuse the horse upon the third trial, on the twenty-first day after service, she may be considered to be with foal. Between these trials, however, if the mare be not gravid, or in foal, the lips of the vagina will be moist, bright, and of a fresh florid

appearance, and with a fresh drop of fluid at the lower part, which being touched will incline to extend. If she be gravid, the surface of the vagina will be dry and of a dirty brown or rusty color, while the drop that before was clear fluid, will be dark and brown. After the third month, the belly will begin to swell, and at the end of the fifth or sixth month the movements of the fœtus may be seen by watching; or by standing the mare at rest and pressing up sharply in the flank, with the thumb and fore-finger closed, the fœtus may be distinctly felt by the rebound.

XIX. How to Know the Foaling Time.

From one to three months before the time of foaling, the udder begins to fill and swell, more or less, and this will continue increasing. During the three weeks immediately preceding the time of foaling, a furrow-like appearance is seen, reaching from the haunch to the tail on each side of the spinal extension, as though the pelvis was separating its parts. This will be more and more apparent as the time approaches. The udder will fill, and two days, generally, though sometimes only one, before foaling, a gummy substance will exude from, and stand at the end of, each teat.

XX. The Foaling Stall.

Whatever the place provided for foaling, it should be so tight that the mare cannot get her limbs through the interstices. It should be warm and well-littered with short, fine straw, and the mare should be left entirely to herself, except in those rare cases when she may need mechanical assistance in foaling. This, however, should not be resorted to unless the size of the fœtus requires it, or a false presentation is made.

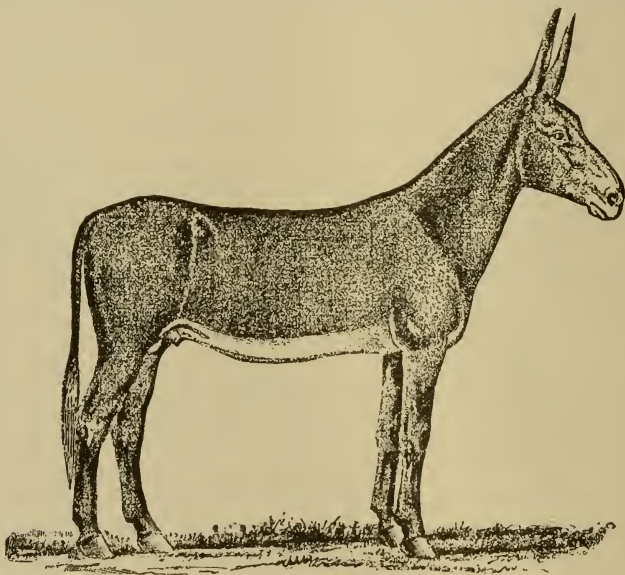
XXI. Abortion, or Sinking the Foal.

From the time when gestation has proceeded three months, and up to the fifth month, there may be danger of abortion. To prevent this, the mare should not be exposed to foul smells, nor to the sight of blood or dying animals, nor should she be allowed to be frightened. She should have better feeding, and less work, since from this time on her system will be called on to nourish the fast-growing fœtus. There are many causes of abortion. Among the most prolific are, allowing her to see food given others, that she does not get herself, and which she likes; sudden fright; sympathy with the distress of other animals; and above all, the germs arising in a stable in which there has been an abortion.

The prevention is to avoid all these things, and to allow the animal plenty of fresh air. If an animal once aborts, unless it is brought on by strain or acute disease, or if once the tendency is established, it is somewhat difficult to overcome the predisposition, which generally arises at about a concurrent period of gestation. Hence, great pains should be taken to prevent any liability to this disaster.

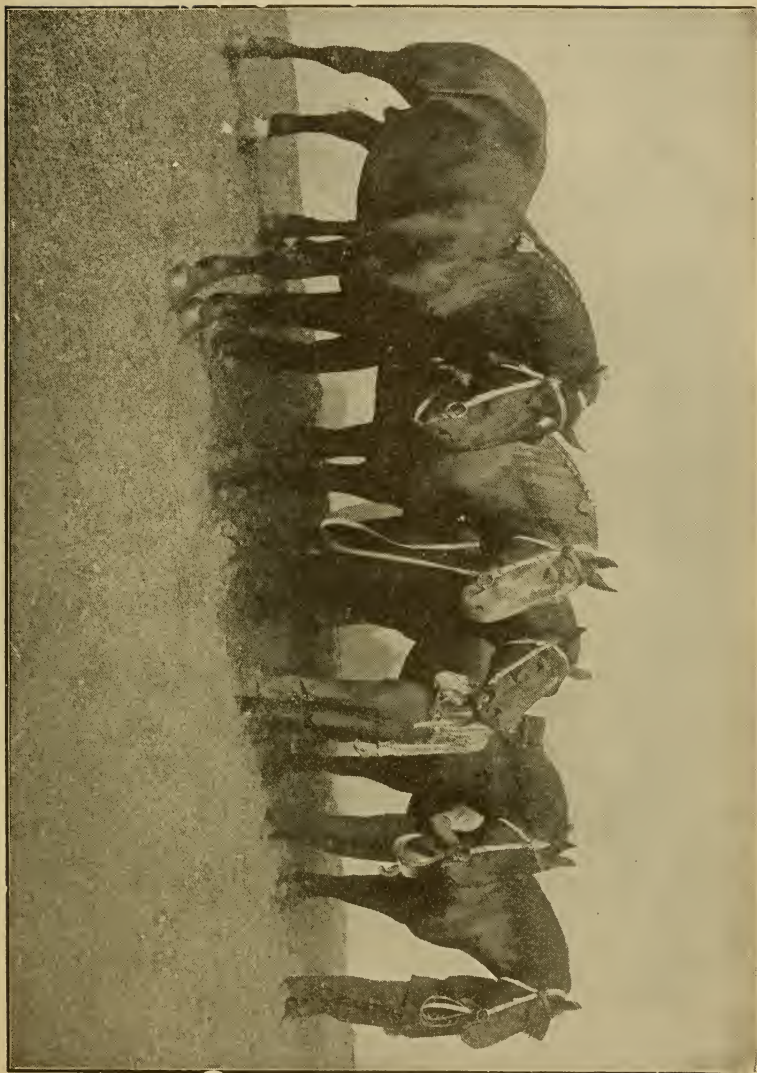
XXII. How to Raise a Colt.

The colt should be allowed to run with the dam until it is about six months old. The mare should have plenty of grass, and such other food as may be necessary to keep up her condition. If, at weaning time, the mare do not dry off kindly, the milk should be drawn by hand, often enough to prevent inflammation; keeping her on dry food will assist in the process of drying, especially if she be put to steady but light work. At all events she should have plenty of walking exercise daily. The colt should be handled and fondled from the time it is a week old, if strong, and a light halter should be put on, to lead it by. Thus it early becomes accustomed to the master, and if kindly treated will soon come to seek the fondling hand. As soon as it will eat, say at three months old, it should be accustomed to a little crushed oats daily, and the mess may be increased from time to time, until it gets a full ration, at six months old.



POITOU-ASS.

Many persons suppose that a colt needs no water. Nothing could be further from the truth. After it is a week old, the colt should be offered water once a day, at noon, and as it increases in age, oftener. When ready to wean, it will already have been accustomed to lead by the halter. Tie it securely where it may not hurt itself, preferably in sight of the mare; feed it generously, give it plenty of water, and allow it to run at play every day.



FRONT VIEW PRIZE WINNING PERCHERONS.



MISSOURI JACKS
Specially photographed for this work.

CHAPTER X.

ASSES AND MULES.

I. THE MULE AND HINNY DEFINED.—II. THE ASS.—III. ANTIQUITY OF THE MULE.
IV. BREEDING-JACKS.—V. LONGEVITY OF THE MULE.—VI. THE VALUE OF
MULES FOR LABOR.—VII. MULES ARE NOT VICIOUS.—VIII. THE BREEDING OF
MULES.

I. The Mule and Hinny Defined.

The word mule signifies a hybrid, that is, the offspring of animals belonging to the same genus, and fertile one with the other, but of different species. Mules or hybrids are usually infertile, one with another, and are always incapable of propagating the species indefinitely. As now generally accepted, the word mule is used to designate the offspring of the male ass with the mare. They have been known and bred since the time of remotest history, having always been prized for their longevity, sure-footedness, and ability to labor in extreme heat.

The Hinny.—The hinny is the produce of a she-ass, bred to a horse. They were called *hinnus* by the Romans;—hence, our name, hinny. They resemble the horse more than the ass, just as the mule, sprung from the mare and ass, resembles the male parent most. Hinnies are handsome, round-bodied like the horse, but exceedingly small, and are also said to be slow and more difficult to manage than the mule proper. They have, therefore, seldom been bred, and when so, soon passed into disuse.

II. The Ass.

The wild ass is said to have been indigenous to Arabia Deserta, and the countries which formed the Babylonian Empire. Those now found in the northern region of India are said to be so fleet, in the hill country, that no horse can overtake them. Four different races seem to be indicated in the Hebrew Scriptures, where they are named *Para*, *Chamor*, *Aton* and *Orud*. Of the wild ass *Para*, Scott's version of the description by Job is as follows :

“Wild tenant of the waste, I sent him there
Among the shrubs, to breath in Freedom's air.
Swift as an arrow in his speed he flies;
Sees from afar the smoky city rise;
Scorns the throng'd street, where slavery drags her load,
The loud-voiced driver and his urging goad:
Where e'er the mountain waves its lofty wood,
A boundless range, he seeks his verdant food.”

III. Antiquity of the Mule.

Mules were used and much prized from a remote antiquity, and are mentioned both in sacred and profane history. They were introduced into the chariot races in the 70th Olympiad, or about 500 years before the Christian era; and in the time of the Romans, Q. Axius, a Roman Senator, paid, according to Pliny, 400,000 sesterces, or more than \$13,000, for a male ass, for the stud; and he also states that the best female asses were worth a like sum to breed sires. When we compute the difference in value between money then and now, the price was greater than that now paid for the most celebrated racing and trotting horses.

IV. Breeding-Jacks.

The best jacks now are those of Spanish origin. They are large, strong-boned, long-bodied, and, of course, long-eared. The cut will give a good representation of the Poitou ass, an animal similar to the Spanish jack. The jack, whatever the breed, is sensitive to cold, and to the influence of storms, and, if not warmly housed in winter, soon becomes useless and disabled, from rheumatic and other affections. Of the jacks imported at an early day into America, as a present to General Washington, Mr. Custis has written as follows:

"The *Royal Gift* and *Knight of Malta*, were sent to General Washington about the year 1787—the *Gift* with a jennet, a present from the King of Spain; and said to have been selected from the royal stud. The *Knight*, I believe, was from the Marquis de Lafayette, and shipped from Marseilles. The *Gift* was a huge and ill shapen jack, near sixteen hands high, very large head, clumsy limbs and to all appearance little calculated for active service; he was of a gray color, probably not young when imported, and died at Mount Vernon but little valued for his mules, which were unwieldy and dull. The *Knight* was of a moderate size, clean limbed, great activity, the fire and ferocity of a tiger, a dark brown, nearly black colour, white belly and muzzle; could only be managed by one groom, and that always at considerable personal risk. He lived to a great age, and was so infirm towards the last as to require lifting. He died on my estate in New Kent, in the state of Virginia, about 1802 or 1803. His mules were all active, spirited, and serviceable; and from stout mares attained considerable size.

"General Washington bred a favorite jack called *Compound*, from the cross of Spanish and Maltese—the *Knight* upon the imported Spanish *Jennet*. This jack was a very superior animal; very long bodied, well set, with all the qualities of the *Knight* and the weight of the Spanish. He was the sire of some of the finest mules at Mount Vernon, and died from accident. The General bred mules from the best of his coach

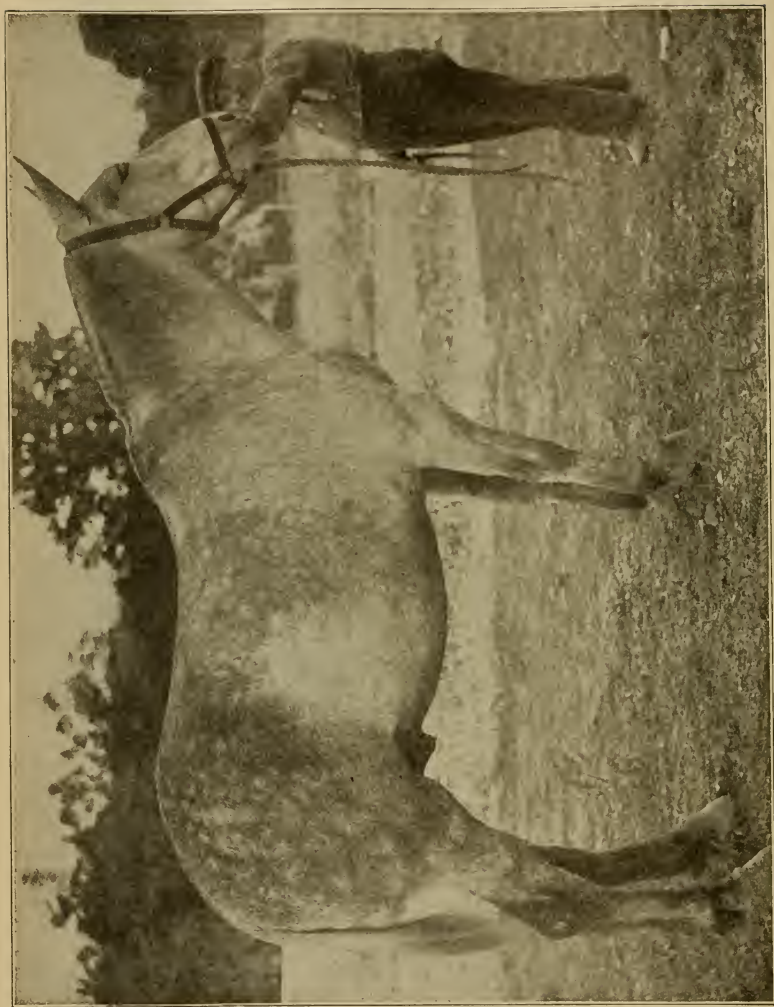
mares, and found the value of the mule to bear a just proportion to the value of the dam. Four mules sold, at the sale of his effects, for upwards



PERCHERON STALLION CASINO.

of \$800: and two more pairs at upwards of \$400 each pair; one pair of these mules were nearly sixteen hands high each.

“From these jacks a compound breed were produced, that, when bred to large mares, were unexcelled for size and activity.”



AN 8 YEAR OLD WESTERN MULE, 19 HANDS HIGH, WEIGHT 1900 POUNDS.

The breeding of jacks and jennets, as the female of the ass is called, is confined to but few hands. These breeding studs are mostly located in Kentucky and Tennessee, though some are found in Ohio, Indiana, Illinois and Missouri. Up to the time of the late war the breeding of this stock was an important industry, the jacks produced being distributed for service all over the Southern and Western States. Since the war, with the breaking up of the great breeding studs, the industry has languished, owing to the decreased demand for mules. A new impetus,



PRIZE WINNING MULE.
Specially photographed for this work.

however, has given rise to the breeding of jacks again in considerable numbers in the South, and this branch of husbandry will undoubtedly again assume more than its original importance; for the agricultural interests of that section are steadily growing, and a constant improvement is noted in the quality and numbers of the live stock.

V. Longevity of the Mule.

The longevity of the mule is proverbial. It was a common saying during the civil war that "mules never died;" they might sometimes be knocked over by a shot, but if one ever died a natural death the army wags refused to credit or record the fact. Pliny gives an account of one, taken from Grecian history, that was eighty years old; and though past labor, followed others, that were carrying materials to build the temple of Minerva at Athens, and seemed to wish to assist them; which so pleased the people, that they ordered he should have free egress to the grain market. Dr. Rees mentions two that were seventy years old in England. Mr. P. S. Skinner says, "I saw myself, in the West Indies, a mule perform his task in a cane mill, that his owner assured me was forty years old;" and adds, writing nearly twenty years ago, "I now own a mare mule twenty-five years old, that I have had in constant work twenty-one years, and can discover no diminution of her powers; she has within a year past often taken upwards of a ton weight in a wagon to Boston, a distance of more than five miles. A gentleman in my neighborhood has owned a very large mule about fourteen years, that cannot be less than twenty-eight years old. He informed me, a few day since, that he could not perceive the least failure in him, and would not exchange him for any farm horse in the country. And I am just informed, from a source entitled to perfect confidence, that a highly respectable gentleman and eminent agriculturist, near Centerville, on the eastern shore of Maryland, owns a mule that is thirty-five years old, as capable of labor as at any former period."

VI. Value of Mules for Labor.

It is beyond dispute that mules will continue to labor for at least double the period of the usefulness of the horse. They endure extreme heat better, but are pinched with cold. It is a mistake to suppose that the mule will subsist on far less food than the horse. In proportion to size, they require about the same quantity; but, weight for weight, they will draw a heavier load; and, for the reason, that they take little notice of what is going on about them, do not fret and seldom scare. As pack-animals, they are far superior to the horse; while, in sure-footedness and freedom from disease, no farm animal, except the goat, can compete with them. The impression that mules can get along with little or no care, and that they may be turned out in the winter to shift for themselves, has led many people to be disappointed in their use. In summer, when a horse would seek the shade, we have seen mules lie prone in the sun and enjoy the heat. For ordinary farm labor and all teaming purposes, mules become more and more valuable as we go south of 40 degrees. As we

proceed north they become less and less serviceable, and few are found in use north of 45 degrees.

VII. Mules are not Vicious.

It is generally supposed that the mule is naturally vicious. This is a mistake. He is resentful and never forgets an injury; and if subjected to a long course of ill usage he at length becomes vicious. On the other hand, no animal is more susceptible to kindness, or will exert himself more strenuously for a kind master. Nevertheless, the mule must have a master, one firm and yet kind. The mule, as some of our readers probably know, has a most perfect means of offense and defense, namely, his heels.



A CHOICE MULE AND TYPICAL OF THE CLASS.

The market requirements of mules are approximately the same as those of the horse. They must be sound, of a marketable age, be in good flesh, have a sleek coat of hair, possess quality and conformation indicative of strength and endurance and be of desirable color. They should also have straight line action and be of a class for which there is an active demand. Serviceably sound is practically all that is looked for, but any unsightly blemish is objectionable, though not in the same degree as with the horse. Mules are rarely used for pleasure purposes, but almost entirely as beasts of burden. Because of this fact slight blemishes that do not interfere with their usefulness receive less consideration than in the horse.

VIII. The Breeding of Mules.

In the breeding of mules, as of all other animals, attention must be paid to the use for which they are intended. If for packing in the mountains, small, compact mules, such as are bred from small, fine Spanish



THE ZEBRULAS AS EXHIBITED AT THE ST. LOUIS WORLD'S FAIR.

The stocky, docile, striped Zebrula is the latest product in the evolution of the horse. Zebrulas are the progeny of the Indian pony stallion and the female zebra. They inherit the endurance of both sire and dam. For them is claimed the capacity to render more service than the mule and that with less food and drink. The Hagenbecks, the great animal showmen, in their experiments at cross-breeding, originated this animal. Whether the Zebrulas can reproduce is yet to be determined. To the thousands of horsemen assembled, the Zebrulas were more than curiosities. They suggested the possible successor of the mule. It was only a suggestion. Beside the Missouri mule, Zebrulas were dwarfs.

It seems particularly adapted to Africa where an especial interest is being taken in the rearing of this animal. It looks as if they will be for that country what the mule is for America. It is also being bred in western United States.

jacks, are required. These are at once agile and sure-footed. For work on Southern plantations medium-sized mules are most sought. These are bred from mares of ordinary size, by good-sized jacks. In breeding mules for the road and for heavy teaming, large, roomy mares are used. These are served with the largest jacks, and at three years old command, when well matched, from \$300 to \$600 a span. The treatment of the mares and of the mule colts should be precisely like that described in the preceding chapter. The colts should be handled young, gently treated and made completely subordinate to the will of the master. At two years old



ZEBRULA MARES.

they may be broken. They should be carefully harnessed, without frightening them, and hitched to a strong wagon, when they will generally move off without much difficulty. Thereafter they may do light work until they are four years old, when they may be put to full labor. Their dentition is similar to that of the horse, and the rule for telling their ages is identical with the advice for that animal.

CHAPTER XI.

HOW TO TRAIN A HORSE.

I. THE OLD SYSTEM AND THE NEW.—II. THE AMERICAN WAY BETTER THAN THE ENGLISH.—III. DIFFERENCE BETWEEN BREAKING AND TRAINING.—IV. FIRST LESSONS.—V. LEARNING TO LEAD.—VI. TO MAKE A COLT COME TO YOU.—VII. LESSONS IN SOUND SIGNALS.—VIII. FLEXIONS.—IX. THE PROPER AGE FOR WORK.—X. HARNESSING AND DRIVING.—XI. THE AGE FOR REAL WORK.—XII. HOW TO SUBDUCE A WILD COLT.—XIII. HANDLING A VICIOUS COLT.—XIV. SUBDUING A VICIOUS OR TRICKY HORSE.—XV. TRAINING A STALLION FOR SERVICE.—XVI. TRAINING FOR DRAFT.—XVII. HOW TO HAVE A GOOD PLOW TEAM.—XVIII. FORMING A GOOD SADDLE HORSE.—XIX. THE DIFFERENT GAITS.—XX. TRAINING TO TROT IN HARNESS.—XXI. FORMING A TROTTER.—XXII. TO TRAIN A RACER.—XXIII. SADDLING.—XXIV. HARNESSING.

I. The Old System and the New.

Under the old system of training, an animal was subdued by main force. What he learned was acquired under the impulse of fear. Under the new system, an animal is taught to depend upon and trust his master, by convincing him that he will not be injured. Under the old system, the whip and spur, and "terrible voice," were the means used to drive and force him up to, and beyond, an object that might be terrifying to a young and inexperienced horse, however harmless in itself. Under the new system, the young horse is allowed to see for himself that steam, harsh noises, great crowds, locomotives, the beating of drums, the thunder of cannon, and the various sights and sounds that, even to the savage and barbarian, would be terrible, are quite innocent, when the master's hand directs. Hence, the horse, trained to obedience and made familiar with the various sights he is to encounter, fears them as little, and is as eager to witness them, as a child. The habit of entire dependence upon the master prompts him to go forward, even into the most imminent danger, without other sign than that of eager curiosity or of obedience to the will of the rider or driver.

It is true that all this may be accomplished by the whip and spur, which are, even now, freely and needlessly used by some brutal teamsters, as well as by many really humane persons, who have never sought to understand the intelligence of the horse, and far less that of the other domestic animals under their care. Hence, to persons of this latter class, the horse is a slave, whereas, to the intelligent master, he is a servant anxious and eager to do his will. The element of fear cannot, of course, be entirely dispensed with in training. A wilful animal must be subdued at any cost of punishment; but this punishment should be as intelligently and humanely administered as in the case of a child. Those who train animals should first, themselves, learn to know what the animal means



FRENCH DRAFT HORSES.

Prize Winners.—Specially photographed for this work.

by his mute language ; in the case of the horse, for instance, they should know at a glance what is meant by the play of the ears, the arch of the neck, the expression of the eyes, and the attitude generally. These things once understood, more than half the difficulty of training is overcome.

II. The American Way Better than the English.

It has often been remarked that English horses are wilder, more dangerous and difficult to subdue, have stronger resisting powers, and are more liable at any time to exhibit freaks of temper, than American-bred horses. This is quite true, and for the reason that, in England, the old system of horse-breaking is more in vogue than in this country. In England, colts are not raised on every farm, as in the United States and Canada, to be the friends and the pets of the children. Their keepers are generally ignorant servants, who seem to think that horses have but two impulses—to eat and to injure. In America, colts are the pets of the boys of the family, and, while running with the mare, they become habituated to all the sights and noises of the farm. They never come to know their real strength as a resisting power against man ; that power lies dormant, because on the farm, as a rule, they have no occasion to exercise it. We have accordingly insisted, as the result of experience, that the education of animals should begin at a very early age, when the power of resistance is small. For, if once an animal finds that the superior intelligence of the master is more than a match for brute force, kindness and careful lessons will thenceforth easily complete the education of all farm animals, and especially that of the young horse.

III. Difference Between Breaking and Training.

The difference between “breaking” and training must already be apparent to the reader. The aim of the first is to subdue, and force is promptly resorted to as the readiest means to this end. The comparatively-weak but intelligently directed brute-force of the master will, of course, generally win, and the animal, broken in spirit, becomes an automaton, performing through fear what he cannot avoid by resistance. In those cases where the superior force of the animal wins, he is thenceforward vicious and tricky, and passes from one master to another, until, worn out in the struggle, he either ruins himself or becomes the drudge of some reckless and brutal teamster.

Training, on the other hand, consists in teaching the young animal to know that, while the master must be obeyed promptly and implicitly, he is truly an indulgent master, requiring nothing but what is necessary to be done, and, once the task is performed, that the rewards of care and rest will follow.

No horse broken by main-strength and brute-force is quite safe for a woman to ride or drive, unless she be a complete horsewoman. The more wilful of them are never safe for any woman to drive. A horse carefully trained, however, is always safe for a woman to drive, if she be not especially nervous, and has accustomed herself to the guidance of horses; the only exceptions being such animals as by defective organizations are naturally vicious, cowardly, timid from imperfect sight, or tainted with insanity. These defects have already been mentioned in the chapter on breeding, under the head of heredity.

IV. First Lessons.

As before stated, the first lesson to be imparted is that of reliance on the will of the master. This lesson in obedience should be given at weaning time, or when the colt is first haltered to be stabled. If it has been haltered, as recommended, when quite young, there will be no resistance. If this has not been done, the colt must be driven into a confined space where it cannot escape. Take the halter in both hands, and keep holding it to the colt until it will touch it with the nose. Do not hurry. The important thing here is to show the animal that there is nothing dangerous about a halter. When the colt ceases to fear, place the halter on the head quickly, and fasten it. If it show no serious fear, tie it up at once. If it seems frightened, allow it to wear the halter a little time before tying up. When you fasten it, do so securely, for at some time or other it will try to break away. When this occurs, halter and strap should be strong enough to resist every effort. When it ceases to pull, it is thoroughly halter-wise, so far as standing quietly is concerned. It will have ceased forever to pull at the halter simply to free itself.

V. Learning To Lead.

The next lesson before the colt is learning to lead. You should have a small yard, into which you can take the colt. Provide yourself with a light switch, and also with a line about ten feet long, to be tied to the end of the halter. Let the colt play around in a circle, if it chooses, for a time. Approach him gently, take the halter by the nose-band with the left hand, while holding the switch in the right hand. If the colt rear, support yourself with the right hand, by grasping the top of the neck to keep the colt down. Use no undue violence. Do not strike it. When it gets through floundering, it will thereafter be quiet. Next take the halter in the right hand, and bid the colt go on. If it refuse, tap it under the belly with the switch, until it moves. If it rears again, again subdue it. So continue until it moves forward. Then talk to it, and pet it, and it will soon lead kindly, turning to the right or left at will

VI. To Make a Colt Come to You.

Have a long flexible whip. Place yourself just so far ahead of the colt that you can easily touch him in the flank, and then bid him "come here," at the same time pulling on the halter. If he will not come, tap him in the flank, or on the fore legs, and so continue until he obeys. If he pulls back, check him, and continue touching him until he comes up. Then pet him and give him a small taste of sugar, or something he likes. Continue in this way until he comes readily at the word. The colt will not always become perfect under the first or second lesson. Perseverance will accomplish each and every other lesson more easily than if violence were used.

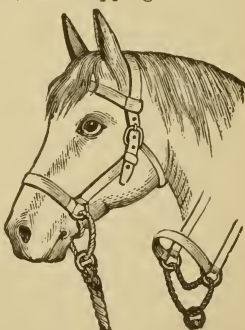
VII. Lessons in Sound Signals.

We have shown that the first lessons are to accustom the colt to prompt obedience to the will of the trainer, as expressed by the voice or signals. The voice, however, must be the chief reliance. The signal by sound, should precede the signal by sign, or the check by the strap or rein: and should always precede the tap of the whip, when the whip is necessary.

A child is taught to speak through its power of imitation. If it never heard spoken language, it would never learn to articulate speech. So, the same word should always be used, to induce the performance by the colt of a certain act, as: Whoa! Back! Go on! Come here! When this has been accomplished, and the colt has been taught to stand at rest, to lead quietly or to circle about the tutor, at the end of the rein, he should next be taught to follow the master about the yard without leading, first with the halter strap in the hand, the tutor backing as the colt follows, and afterwards with the strap over the neck of the colt.

The preliminary lesson in backing may be taught, by taking the colt by the head, standing in front of him, and using the word "back," at the same time, pressing in the proper direction, and tapping it on the breast, if necessary. After a time the animal will back promptly and continuously at the word. This lesson, and all others of flexions, must be taught with the bridle and bit, since to back easily and properly, the head must be raised.

In all first lessons the form of the halter is important. We give that of a good one, which will not hurt the colt unless he pulls strongly on it. Upon ceasing, the halter will let up of itself. When once the animal is taught to stand quietly, an ordinary halter may be used.



A GOOD FORM FOR A HALTER.

VIII. Flexions.

That the colt may be able promptly to turn in any direction, what are called flexions should be practiced. The more simple of these are, raising the head high, putting it down close to the ground and then raising it, turning the head to the right or the left side, with the nose close to the body, but obliquely to it, etc. Full instruction in these flexions need not be perfected until the animal is two or three years old; and, in fact, but little of this exercise is actually necessary, except with the saddle horse. For saddle horses, flexions are especially important, since the object of them is to render the head, neck, body and limbs supple and capable of varied action. A curb-bit is necessary to their proper performance, and hence only preliminary and simple lessons should be given the colt, for the curb should not be used until the animal is nearly ready for work.

At the proper age, put on a bridle with a curb-bit, taking care that it fits properly in every part. Between the chain and jaw, the finger should slip easily, and the bit should just touch the upper part of the lips, and that only in the slightest manner. Stand in front of the horse, take the off or right rein with the right hand about six inches from the branch of the bit, and the near or left rein with the left hand, at about half the distance from the branch. Draw the right hand to the body, and press with the left, so as to turn the bit in the mouth. If the horse backs, follow him up, pressing steadily until he lowers his head, and flexes his jaw. Then slip the left hand along the rein until it is opposite the right hand and press the head to the breast, holding it curbed perpendicularly but obliquely to the right, until the horse will maintain the position himself.

Then flex the jaw to the left by a reverse action to that above given. Teach the horse to raise his head high and perpendicularly, by taking each rein, six inches from the branch, and raising, and pressing slightly back. Teach him to lower the head by a contrary action. Next teach him to sway the head to the right and to the left, to raise and lower the head alternately, by means that will readily suggest themselves. It will surprise you to find how soon the average horse will understand.

In all this, use no undue violence, and above all bear in mind that a curb-bit is a powerful lever, and must be carefully handled. When the animal is perfect in these flexions, take the reins in the left hand, near the branches of the bit; and standing close by and facing the shoulder, holding the head fairly up, and to you, induce the animal to move his hind feet, in a circle from you, the fore feet remaining stationary, as a pivot. This lesson perfect, make him stand firm behind, and move his fore parts from you in a circle. There are many other flexions taught in the menage; but the foregoing are sufficient for a saddle horse or light

driving horse, and these are not necessary unless the animal be intended for this kind of work, or for racing or trotting. Remember one thing, teach only one lesson at a time.

Again, let us repeat the caution, never to use undue violence, and never lose your temper, never speak loud, or jerk the reins, or act upon sudden impulse. Keep cool. Your object is to train, not break the will. When the animal understands the wish, and performs it, reward it with something it likes, and let it rest; a bit of carrot, or sugar for instance, goes a great way with a young horse.

IX. The Proper Age for Work.

The preliminary training may go forward from the time the colt is six months old, until the age of two years is reached. It will by this time be quite submissive to the will of the trainer, and without fear. A pad, with light stirrup-leathers attached, may be put on, and the colt be allowed to play about the yard with it, at the end of the rein. A well-fitting bridle may be put on, with keys attached to the center of the bit, with which the colt may amuse itself. When the colt is one year old and over, the crupper-strap may be put on, and the little animal may be reined loosely to the top of the pad. Later, the side reins may be put on, and the head gradually brought into position.

The colt, if stabled, should be regularly cleaned. His feet should be raised, and the hoofs lightly tapped with a hammer. He should be taught to lead, walk and trot, beside the trainer. Thus at the age of two years, if well-grown, he will be ready to be trained to light work, or, as it used to be put, "broken to harness."

Under the course of treatment we have laid down, he will have learned the use of the reins,—to go back, or forward, and to turn to the right or left at the word; and above all, he will have confidence in himself, and no fear of his master. In nine cases out of ten, if the colt has been taught to lead beside a well trained team, and used to the rattling of the wagon, he will go off pretty much like an old horse, except for his superabundant life, the first time he is harnessed.

X. Harnessing and Driving.

Two years is the best age for putting the colt to light work. He has better teeth then than at three years old, and has arrived at the period when careful driving will assist to spread and develop the frame.

The colt will, of course, first have been taught to allow himself to be harnessed and unharnessed kindly. Put the harness on carefully and hitch him up beside a well-trained horse, usually on the off side, and start the team; then, if he plunge, he can do no mischief. Tie the double-tree of the old horse, so that he can pull all the load if necessary

and bid them go. If the colt plunge and rear, keep the steady horse in motion, and talk to the colt. If he show too much temper, a few sharp cuts of the whip will bring him to terms, but in punishing him strike but once, and repeat if necessary. This discipline, administered with care, and driving to make them way-wise, is all the difficulty one need ever have with colts.

XI. The Age for Real Work.

Having performed light work, when from two to three years of age, let the colts have rest during the twelvemonth from three to four years of age. They are then shedding their principal teeth, and should be allowed to grow. At five years they may be put to real work, and they will then go on getting better and wiser, until they are eight years old, at which age a horse should be kind and without fear under any circumstances, and fit for any one to drive, who can hold the reins, and has judgment enough to keep from running against obstacles.

This may seem like a long course of training, and one accompanied by much trouble. It all, however, comes in the regular routine of farm life, and must be undertaken in one way or another, unless the animal be intended for mere drudgery.

XII. How to Subdue a Wild Colt.

The narrative of how the writer once subdued, and rendered perfectly amenable to the will, a pair of wild, high-bred four-year-old colts, that had never even been haltered, may prove interesting. The colts had been purchased from a person who was a capital and humane horseman, but believed in never handling a colt until four years old—and this is certainly better than imperfect handling. The two were driven together, into a close stall. From the outside of the stall, after many trials, in which no violence was used, but, on the contrary, soothing words, strong cavesson halters, such as are shown in the illustration, were put on the animals and buckled. A rope twenty-four feet long, and with a powerful snap hook in the middle, was attached to the ring of the halter, leaving the ends twelve feet. Two men were placed at each end of the rope, whose only duty was to keep it spread, and, so accommodate themselves to the movement of the colt, as to keep it as nearly within bounds as possible. Our horseman friend superintended one colt, myself the other. The colts were allowed to find their way each into separate yards. The men picked up the ends of the rope, and the struggle began.

The masters' part was simply to direct the movements of the men, and talk, each to his own colt. In ten minutes the rearing and plunging of one colt was over, and in less than fifteen minutes the struggles of the

other had ceased; in less than twenty minutes each of the colts, exhausted, allowed the hand of the master to be placed on the nose, and himself to be gently fondled.

Standing a short distance before the colt, with a flexible whip in hand and a cord attached to the ring of the halter, the men still holding the ends of the rope, but slack, I bade the colt come forward, tapping it on the knee after every word, with the end of the whip. The colt did not fear the master, only the assistants, and soon first one, and then the other, came forward promptly, and within an hour would follow like a dog.

They were led home and put in the stable. The next day they were bitted, and their training proceeded steadily. Within a week each of them was ridden, and in ten days they were harnessed together and driven. They were broken, during the season, to light driving under sharp curb-bits, accustomed to various odd sights, and having first been rendered submissive to the voice and will of the master, never showed fear that could not be quieted by a word.

XIII. Handling a Vicious Colt.

Some colts are naturally vicious. The head of such an animal is represented in one of the illustrations given with Chapter IV. If you unfortunately have one, get him into a close stall, fasten him securely in, halter him and get him in the yard, using ropes to the halter-ring, not less than twenty feet at each end. After he has struggled and exhausted himself, proceed to make him lie down. This can be done in the following manner. Have ready a strong bridle with a snaffle-bit, and put it on him; also fasten around the refractory youngster a good padded surcingle, with a strap for the fore leg having a loop that will draw tight around the fetlock. Raise the leg, buckle the end of the strap securely around the arm, and you have him so he cannot kick. Fasten a longer strap with a similar loop, but no buckle, around the off fetlock; pass the end under the surcingle, taking the end in the right hand, while the left grasps the bridle by both reins; cast off the hampering ropes, and as the horse rears to free himself, pull tight the strap that has been passed under the surcingle, and when he comes down it will be on the knees. As he struggles, press his head from you, by pulling the off rein tight over his neck, and he will fall over on the side. When he gives up entirely, and lies still, the horse should be fondled, the straps taken off, and after a time, he should be allowed to rise. If not entirely subdued, the same thing must be gone over again.

This is essentially Mr. Rarey's plan. It need never be resorted to except under extraordinary circumstances, and the operator must have

been accustomed to handling horses, and understand the movements necessary in overcoming vicious and rearing animals.

Another plan is to hople the horse and throw him down, but the one we have described is the best and most successful. It should never be attempted, however, except in a yard so thoroughly covered with some soft material that the animal will not hurt itself in falling.

XIV. Subduing a Vicious or Tricky Horse.

No person who is not well assured of his own power, should have anything to do with a vicious horse, especially if the animal be vicious from some physical infirmity, such as partial insanity, wicked temper, etc. If the horse has been made tricky by a previous timid owner, the case is not so bad. Go into the stable where he is tied, and speak to him in a firm voice. Put a strong snaffle bridle on him, take it by the bit, and order him to back. If he do not obey, strike him sharply with the whip on the fore limbs, holding him with the left hand, yourself partly facing to the rear, but so you can see every motion of the eye and ear. If he kick, cut him sharply with the whip (a rawhide is best) just above the hock, over the fleshy part of the leg. If he rear, cut him over the fore legs --never, however, giving more than one stroke at a time.

When he backs, take him into a small, close yard, and make him obey you, coming forward, backing, or standing, as you order. If he again show signs of temper, or unruliness, proceed to make him lie down, as before directed. But a horse that has been in the habit of having his own way with a previous master, is thereafter never safe for any one to drive, except him who has become his conqueror.

In making a horse lie down, never use undue violence. Once the straps are fastened, you have him completely in your power. Let him struggle; it will do him good. You have simply to watch, keep him from hurting you, and seize the proper moment for subduing him.

Once you have him down, and quiet, show him a buffalo robe, or any other object he dislikes; touch him with it, and let him touch it with his nose. When he at length smells at it, let him satisfy himself that it will not hurt him. At the first attempt at putting him down, if he get the advantage, let him rise and then try again. When, however, you have him in your power and quiet, soothe him; pass your hand repeatedly over his body; breathe in his nostrils; open his mouth; gently stroke his ears and nose, and let him taste of something he likes. Thus, by using judgment, knowing your own power and ability to manage an animal, the most vicious can be subdued to your will, if not to that of other drivers. But, once you undertake to subdue a horse, do not leave him until he gives up completely.

XV. Training a Stallion for Service.

For the reason that a stallion is stronger, more courageous, higher in nervous force, and more self-willed than the gelding, it is absolutely necessary that his actual training begin from the time he is a year old. He must be stabled, unless a pasture be provided where he may run every day. The ordinary training to halter, and in the flexions, learning to go forward, to back, to stand, to go kindly under the saddle and in harness, may be proceeded with much as in the case of any other colt. In addition to these exercises, he should be taught to circle at the end of the long bridle rein, to the right and to the left at the word of command, to describe the figure eight, to kneel, to sit on his haunches, and to rear and to come as suddenly down at the word of command. These lessons being acquired, he should be exercised in them frequently, and he also taught to come instantly to his master at the word, without bridle or halter-rein.

It will take time, all this, but henceforth he will not be found dragging his keeper about as though he were a toy attached to him. When the actual season of service is at hand, it will save many an accident, when in contact with unruly mares.

Sooner or later, there may come a time when the stallion will resist authority, and then there must be no hesitation. The whip must then be used sharply and strongly, to subdue him. If he comes at you with mouth open, strike him suddenly a stinging blow across the nose. If he rears, cut him across the fore legs. If he kick, strike across the hind legs, just under the stifle. The whip should be strong, long, flexible, of the best workmanship and loaded with lead at the handle. We have known its use, in striking a frantic brute behind the ears, to bring him down.

Remember what has been said about not striking more than once. Let there be a distinct interval between each sharp stroke, accompanied by as distinct a word of command. There is really little danger, to the cool horseman.

The horse and master should never lose temper at the same time. If so, the strongest brute-force will certainly conquer. After a stallion is once thoroughly trained, never trust him to any but a thoroughly competent groom, and one of calm courage. He is too valuable an animal to be either abused or spoiled. And during the season of service, never allow him to be ridden from one station to another. He should be led beside another horse, even when taking his daily exercise. This exercise should be thorough, out of the season of service, except for a period of rest of a month's duration immediately after the season. During the season,

the exercise must be sufficient to keep the muscular condition well up, and the digestive organs in perfect order. Thus only can you expect to have the most perfect colts as the produce of your sire.

XVI. Training for Draft.

A horse to be used safely for draft, requires less training than any other. He has but one thing to learn; viz: to exert his strength to the best advantage when occasion requires. To accomplish this, he should be daily exercised at a dead pull, being careful always not to overload, until he has acquired his maximum strength, which will not be until the age of eight or nine years is reached.

Training to the Wagon.—The wagon-horse should be trained to trot steadily with a light load, and to walk fast with a medium load. He must turn readily to the right and left, and describe short circles; he should also be taught to stop suddenly, by throwing himself in the breechings, so as to hold a wagon steady in going down hill, and last, but not least important, he should be taught to back all that he can draw forward.

XVII. How to Have a Good Plow Team.

A plow team should be thoroughly under control. The animals should be trained to the word, fully as much as to the rein, and taught to obey promptly the slightest signal. They must be evenly matched for strength and agility; for a fast, fresh horse, and a slow, dull one, together, are bad enough anywhere, but worst of all at the plow. With such a team, no plowman can do good work, and without good plowing we need not expect good crops. The team should be taught to move forward without crowding together or pulling apart; at the end of the furrow, the horse describing the least segment of the circle, should keep a little behind the other when coming about, so as to avoid being stepped on; and in the case of coming short-about, as in turning corners, he should make the turn by a series of short steps. To accomplish this, the team must be talked to, though few take the trouble to do it, and hence we seldom see a really perfect plow team, one that can accomplish their task with the least labor to themselves and their driver.

XVIII. Forming a Good Saddle Horse.

The forming of a saddle-horse, perfect in all his gaits, and amenable to the slightest sign of the bridle, voice, or heel of the rider, is more difficult than any other special training. It can only be done under a sharp curb-bit, and, to use this properly, the rider must have perfect command of himself in the saddle, and the lightest possible hand in using the reins. He must first become a horseman himself, before he can train a horse to the saddle. The animal should be perfectly flexed,

to render supple every portion of the body and limbs. He must be taught to go with head well-up and haunches well under him, to describe short circles and the figure eight, to turn, using the hind feet as a pivot, and also with the fore feet as a pivot; and he should know how to wheel suddenly without danger of unseating his rider. This latter is accomplished by a turn of the hind feet, the fore feet being in the air, and just after the impulse is partially given for the forward movement.

A saddle-horse should also be taught to change the leading foot, while in motion; and under whatever gait. The idea will be caught from the manner in which a person changes the leading foot in catching the step of another person. The horse's head is to be turned somewhat out of line by pressure on the bridle-rein, and also by pressure of the opposite foot of the rider. This will throw the head and croup out of the natural line of progression somewhat, as is done at starting, and then by a peculiar movement of the limbs their motion is changed. Thus, if the horse is leading with the right fore-leg, turn the head to the right, and, with the heel turn the croup to the left, and *vice versa*. Once learned, it is never forgotten.

XIX. The Different Gaits.

The natural gaits of the horse are walking, trotting and galloping. Walking is performed in 1-2-3-4 time, and in regular cadence. The ordinary trot and the jog trot are but modifications of the walk.

Galloping is performed in 1,2-3,4 time, and the faster the stride, the more nearly simultaneously are the fore feet and hind feet brought down, so that when the horse is running at speed, the movement is apparently in 1-2 time. Then the animal is extended to the utmost, with head and tail straight out. The gait is truly a succession of leaps, and soon exhausts the animal.

The slower the gallop, the less should the animal be extended, and the more should the head be raised and the haunches thrown under the body. Thus when an animal acquires the distressing, but fashionable, promenade canter, if he is handsome and has other corresponding accomplishments, he is almost priceless. The promenade canter is taught by rein-ing the horse in to get his head well up, and then restraining him to the pace required. Thus the slower he goes, the more upright he holds himself. To teach this, the spur must be used, but with discretion.

The canter then is a slow gallop. The hand-gallop is faster and is an easy gait for the horse, since he goes at half speed and in a natural manner. The running gait is not distressing until the violent exertion begins to tell on the wind and bottom.

Besides these, and other artificial modifications of the gallop, the pace and its modifications, are the only other gaits which a horse may be taught; for leaping, wheeling, rearing and springing forward or from side to side, are all forms of the gallop. The amble is sometimes classed as a modified pace. It is, in reality, a slow gallop, easy and smooth, and, like any other saddle gait, must be taught under the curb.

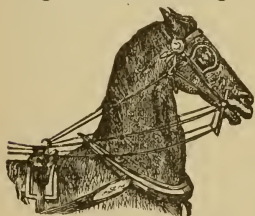
The true pacing horse lifts the fore and hind feet simultaneously on a side, first on one side and then the other. Like running at speed, it is performed in 1-2 time. The rack is a modified pace. Instead of two feet being lifted simultaneously on the one side and then the other, the feet are lifted in 1-2, 3-4 time, but not regularly as in the walk.

Single-foot, again, is a trained rack. Some horses take to it easily, and in fact almost naturally, just as some horses take to pacing naturally. But it often takes time to instruct the horse therein, though once acquired, it is not soon forgotten.

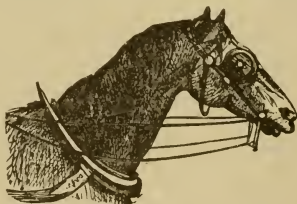
No written instructions can be given for adapting all these gaits, except such general rules as are laid down for rendering the animal amenable to training. Once, by practice, you have imparted the gait, be sure to give the animal a kind word, and a rewarding caress.

XX. Training to Trot in Harness.

If a horse have the trotting instinct, all that is necessary in order to develop it is perseverance and training. The head should be carried tolerably high, but not unnaturally so. The conformation of the horse must be studied, (see Chapter IV), and to assist the reader further, two cuts are given, one showing a horse's head, strained unnaturally and unduly



AN UNNATURAL POSITION.



HEAD CARRIED NATURALLY.

by the bearing rein, the other showing the head drawn up naturally with the bit. In the one case the head is strained up by both check rein and curb, while in the other it is simply held in proper position by the curb.

There is no objection to the use of the cheek rein if it be not improperly used. It serves to keep the horse in shape under a slack rein, and from putting his head to the ground, when standing at rest.

A matter in relation to driving in light harness, under the curb, may here be worth relating. We once trained a pair of fine roadster colts to

drive together in harness, solely under a pair of sharp curb-bits. This was thirty years ago. We were told that we **could** get no speed out of them, and that there would be danger of their falling. The last we knew to be nonsense, and the first we found to be a mistake. There were few teams that could out-foot them on the road; and, trotting at speed, they seemed to be going upon a slack rein. Not so, however; their mouths had never been calloused by the sawing of the "pulling bit," and they were amenable to the slightest sign. In fact, they were kept in perfect form, but it required delicate handling to do it. How much more elegant was this than the "g'lang" style adopted by too many persons when driving for pleasure on the road. Train, therefore, a pair of horses or a single light-driving horse, under the curb always, and, then, if you wish, you may drive them handsomely under the snaffle.

XXI. Forming a Trotter.

All that is required in a horse for trotting a race, is that he go fast enough. The training of trotters is a fine art, and one in which but few persons gain eminent success. Yet, a fair amount of the speed that is in a horse, may be gotten out of him, by strict attention to feed, water, grooming and proper work. He must be exercised every day to bring his muscles into proper condition for fast work, and at some period in each exercise, he must be made to trot as fast as he can, without breaking into a run. Thus his speed may be gradually increased, until at last he will forget the impulse to run, and if, in urging him strongly, he goes off his feet, he can readily be made to catch the stride again, by changing the bit; that is by pulling him a little out of line, as in making a horse change his leading foot. It is not necessary that you pull him hard to make him trot fast. The pull should only be hard enough to keep him steady and up to his gait.

The real work is done by long continued driving, and by lengthening his stride, by means of every persuasion possible. Do not expect to succeed the first or second year with a colt. A horse seldom comes to his full trotting power, until he is seven or eight years old, and often not until he is eleven or twelve. Hence, the large prices the fast ones bring.

XXII. To Train a Racer.

With running horses, as with saddle horses, it is necessary that they first be trained into perfect obedience; and the lessons in flexions must also be attended to, so that their limbs and bodies may be rendered supple. This part of the training having been thoroughly accomplished, all that is required is to keep them in perfect muscular condition, by proper feeding, grooming and exercise. They are then taught to increase their stride by daily speeding them, extending the trial from time to time until they

attain their best speed. This training should begin at two years old. At three, they should be given an extended stride, and they will reach their full powers at four, five or six years of age.

The training of colts to run fast races at two years old, is severely to be condemned, if the future usefulness of the animal is to be considered. Nevertheless, as long as it is found profitable by breeders and trainers, it will no doubt be practiced. The training of running horses, like the training of trotters, is a fine art. Yet the general principles, we have given, may be understood by all. A diet of oats and hay, the best of stable care, and daily work upon a proper course, under the eye of an intelligent master, are the things necessary to get the speed out of well bred horses; and no other than properly-bred animals should ever be trained for great speed. It is not in them.

The horse being in motion, the rider throws nearly all his weight in the stirrups, steadying himself with his knees and thighs. The rear of the body is thrown back and the loin arched, so as not to carry the weight too far forward. The trainer must know how to ride with the greatest ease to the horse, and to assist the movement by every means in his power; thus, the leg, from the knee, will be slightly thrown back, so that by stiffening the leg, the rider's center of weight may be easily changed, without his ceasing to bear firmly in the stirrups.

These directions are for riders or jockeys of medium weight. Lighter ones ride with longer stirrups, supporting themselves more by the thighs. The best race-riders scarcely, if at all, touch the seat of the saddle. This gives a good command of the horse, but is only used in race-riding, since it soon tires out the rider. The same position, however, will ease any horse in galloping over bad or rough ground, or any space that must be quickly ridden over.

XXIII. Saddling.

It will only be necessary to add some general directions to this chapter. In saddling a horse, for whatever purpose, do not use undue haste. Do not throw the saddle on, especially if the horse be young, or in the least inclined to nervousness. Go about the matter quietly and in a business-like way. See that the saddle fits. If it do not, make it fit. See that the girths are properly adjusted, and tightened, and that the crupper-strap, if there be one, is smooth and well fitting. The bridle must also be looked to; see that it is strong, properly put on, and of the right length from the head-piece to the bit. Before mounting, look again to the girths. They may need tightening another hole.

XXIV. Harnessing.

In harnessing a horse it is also necessary that the gear be perfect in its fit, and not heavier than occasion requires. See that the back band does

not pinch, that the hames fit the collar, and that the collar fits the horse. For draft, especially, there should be room enough between the lower part of the collar and neck for the hand to be easily thrust between. If it is a breast collar, see that the draft-band is at the right place on the breast. For light work, a horse may have a closer-fitting collar than for heavy work, but whatever the work, the collar should be made to fit the horse, and not the horse to fit the collar. A horse may, indeed, work in a badly fitting harness. So may a man with an ill made tool.

Pulling at the Halter.

When a horse acquires the habit of pulling on the halter, it is very difficult to break him. We have already stated the prevention; the first halter put on the colt should be strong enough to resist all attempts at breaking.



CARMON, AT TWELVE YEARS OF AGE.

Standard bred carriage stallion, shown as "Glorious Thunder Cloud." At the head of the Government Stud at the Colorado Experiment Station.

A strong biting harness and fastenings that cannot be broken are arranged so that, when the horse pulls back, the whole weight of the pull will come on the jaw. One effort will satisfy him of his inability to break loose, and the punishment will be such that he will not pull thereafter.

CHAPTER XII.

STABLES AND OTHER SHELTER.

I. THE ECONOMY OF COMFORT.—II. HOW TO BUILD STABLES.—III. WHERE TO KEEP HARNESS.—IV. TEMPERATURE AND VENTILATION.—V. THE ARRANGEMENT OF STALLS.—VI. CONSTRUCTION OF MANGERS AND RACKS.—VII. THE HAY AND STRAW LOFT.—VIII. AN ECONOMICAL GRANARY.—IX. THE WAGON AND CARRIAGE FLOOR.—X. THE HARNESS ROOM.—XI. THE STABLE-YARD AND OUT-SHEDS. XII. GRASS LOTS NEAR THE STABLE.—XIII. A GOOD SUPPLY OF WATER.—XIV. CLEANING THE STABLE.

I. The Economy of Comfort.

In building a stable, or other structure for housing animals, however rough it may be, the economy of comfort should be as carefully studied as though the building were intended for the family. Even the wealthiest do not always do this. Everything may be elegant and costly, and yet there is often less real comfort and economy, in the arrangement of their stables and barns, than is found in the poor man's buildings which, though rough, may, nevertheless, be arranged with an intelligent aptitude for making a place for everything needed and proper facilities, crude though they be, for doing the work and providing for the comfort of the occupants in the easiest but most thorough manner.

The selection of the site is of importance, since much depends upon this, when drainage and ventilation are considered. A commanding situation is generally selected for the dwelling house, and there is no reason why the next-best location should not be taken for the stable. The horse-stable should, if possible, be a building separate and distinct from the barn. In a suburban place, it need not be entirely hidden from the house. Neither, on the farm, is it proper that it be glaringly exposed to view, to save steps in the morning. In either case the stable may be somewhat hidden by planted trees, but not so much so as to cut off the free circulation of air. On the farm, if there is a chance for a bank-basement, breeding-cattle, requiring extra care, may occupy the basement; but never put horses there. Like birds, they require an abundance of air, but must not be exposed to drafts. The stable should be comfortably warm in winter and cool in summer. Attention to this point not only secures economy in feeding, and perfect health, but promotes that peculiar luster and softness of the hair, which all the grooming possible cannot give without it.

II. How to Build Stables.

The stable floor should not be less than sixteen feet wide. The walls should be at least eight feet high, though nine is better; and the horses

should stand in a single row, when but few are kept. The heads of the animals should be toward the wall, so that the ventilators may admit air directly to them, and as near the top as possible. If more horses are kept than a single row will accommodate, in a barn of the size wished, they may stand in a double row, with sufficient space behind each row that they cannot kick each other. Thirty-four feet in width will be ample.

III. Where to Keep Harness.

For farm or draft horses, the harness may hang in the stable on pegs seven feet high, at the rear of each horse. But carriage harness, or other fine gear, should be hung in the harness room, out of the way of dust and the effluvia of the stable. The harness room is, indeed, the proper place for all harness, but few persons will take the trouble to carry it there, and it is, on the whole, economy to hang it as we have stated, especially when there is abundant light admitted to the stable of draft horses from proper windows, and the ventilation is perfect.

IV. Temperature and Ventilation.

The proper temperature for the stable is fifty degrees, ranging to sixty-five in summer, but never below forty in winter. The reason is obvious. The horse is especially sensitive to cold, and when the temperature is less than fifty degrees, the system becomes chilled. This may be obviated by clothing; and, here again, is one of the most important matters in stable management, both on the score of economy and of comfort, though it is one too generally neglected. The proper heat of the body must be kept up in some way. It is cheaper to do so by means of clothing, than by extra feeding. So, in summer, a thin sheet keeps the body cool, and is especially useful in protecting the animal, measurably, from flies.

Ventilation, again, is all-important, since by this means not only is the proper supply of fresh air constantly admitted, and without undue drafts, but it is also an important means of regulating the temperature, especially in winter. If the stable be made with hollow walls, the ventilation may come up through these. In any case, however, the air should be admitted as high up as possible.

A simple means of admitting air is by the use of sliding panels, which may be moved easily up and down, if hung with sash-weights, as in the case of windows. If the windows themselves are the ventilators, the same rule will apply.

Not the least important, in this connection, are the pipes for conveying the impure air up through the building and out at the roof. The main ventilating trunk should be not less than four feet square, beginning at

the center of the stable and leading to the peak of the roof. Funnel-shaped branches, opening behind each two or three horses, should connect with the main trunk. If the main ventilating trunk be provided with proper doors, it may serve to convey straw down from above for bedding, and also hay, if open mangers are used; and it may be remarked, in passing, that open mangers are altogether the best, to our way of thinking.

An excellent additional means of ventilation to supply cool air in summer and warm air in winter, is Mr. Wilkinson's plan of sub-earth ventilation. This consists, simply, in laying an eight or ten-inch tile tube at a depth of four to six feet under ground, and extending for 300 to 400 feet away, to an out-lot. The air coming from this pipe will always be cool, or about fifty degrees in winter, and seldom more than that in summer. If four funnel-shaped openings are provided at the upper end of the upright tube, it will always catch air from whatever direction the breeze comes. This means of ventilation is especially valuable in country dwellings, cellars and dairies.

V. The Arrangement of Stalls.

Large stalls are best, and each horse should have a separate stall. Whether built cheaply or elaborately, the stalls should vary in width from five feet, to five feet six inches, according to the size of the horse, and should be ten feet from front to rear. The partition-posts at the rear should be round, not less than five inches in diameter, with a gain cut on the inside, to admit the ends of the plank forming the sides of the stalls. The partition planks may lie between cleats. The posts may incline inward or not. If they do so incline, the bottom should be ten feet from the wall, and the top eight feet. The sides should be four and a half feet high, of two-inch plank, and if on the top of this there be placed a strip of strong woven-wire cloth, two feet higher, it will prevent ugly horses from biting or gnawing each other, and at the same time allow good-tempered ones to get their noses near together for companionship.

The floor should be double, and the upper one should be in three parts; that is, the first three feet in front, of hard-wood, two-inch plank should be laid close and nailed solid; the other two sections, of narrow, hard-wood plank are nailed on strong end-pieces, and with half-inch spaces between. These are to be hinged to other plank nine inches wide, next the sides of the stall, so as to shut together at the middle, to within half an inch of each other. Thus, all the liquid matter passes directly through to the solid and water-tight floor beneath, made of planed and grooved plank, and ending just inside the posts, in a narrow gutter, whence it is conveyed away to a tank.

Thus the animals are always clean, and the upper floor is readily raised for the daily washing it should receive. The solid dung and litter may be wheeled outside, or if there is a basement, throw it down through a trap door, to be made into compost.

If the expense of such a floor, as that described, is deemed too great, the floor may be made of hard-wood plank, or better, of smooth cobble stone laid in sand. Hard-rammed clay makes a most comfortable floor to stand on, if it be kept repaired, and straw enough is used for bedding to keep the animals clean. Plenty of straw must be used, whatever the floor, where the animal lies down.

The Economy of Bedding.—It is mistaken economy to stint the bedding. With a full bed, so that the animal may not only lie clean, but comfortably in other respects, there is no more straw soiled than with a thin bed. What remains clean can be used again. And, if it be an object, much of the soiled straw may be dried and used again. On farms where there is much straw wasted, it is incomprehensible that an animal should be scantily bedded. The soiled straw, contains the most valuable portion of the manure—the urine—and is a mine of wealth to a careful farmer.

VI. Construction of Mangers and Racks.

The construction of the manger should be such as to allow plenty of room for hay. It should be built from about eighteen inches above the floor, with a slat bottom or a tight bottom as preferred. It need not be more than two feet four inches wide at the top, by eighteen inches at the bottom, and about three feet four inches high. It should extend clear across the stall, the top rail being of sound, solid oak, with a feed-box two feet wide, for grain and cut feed, and as long as the manger is wide; sixteen inches will be depth enough, and if it slope to about eighteen inches at the bottom, so much the better.

On the other side may be an iron vessel that will hold a pail of water, and so arranged that it may be fastened in and removed at pleasure, for cleaning. An iron feed-box similarly arranged is better than one of wood, on the score of cleanliness. If there is to be a hay rack, the manger should not be omitted, and this should be larger at the top than at the bottom, and so arranged that the hay may be thrown in from the loft. The bars of the rack should be about six inches apart, and these also may be bought, of iron, if it can be afforded, and hung so as to open and fall back against the wall, for ease in putting in hay. The manger should have a substantial ring at the top, with not less than a two-inch opening, to tie to.

The manger may be built of yellow pine or oak, an inch and a half thick for the front, back and ends, and the bottom of two-inch plank,

unless it be made of iron and hinged at the back, to let down for cleaning, in which case a secure catch must be used in front. The top-front of the manger should be protected with two and a half inch iron bands, rounded at the edges, firmly screwed on, so as to project slightly over the top bar. They prevent the manger being gnawed and disfigured. It is also better that a post be placed from the ground to the under-side of the top bar of the manger, and midway from the sides of the stall. In this case a ring may be screwed by the shank, or stapled into the post, in such a way that it may play freely. The tie may have a light weight at the end, so that the bight of the halter will be in no danger of getting under the fore legs of the horse.

VII. The Hay and Straw Loft.

Every stable should have a loft for hay and for straw, with chutes, or tubes, for easily throwing it below. The chute for straw may be the tube used for ventilation and, of course, must have a tightly-fitting door to prevent effluvia from entering the hay loft. The ventilating tube may be used for hay, even if the hay has to be carried from the floor to the manger, but it is better that the hay-chute connect directly with the manger. If a rack is used, the chute should connect therewith.

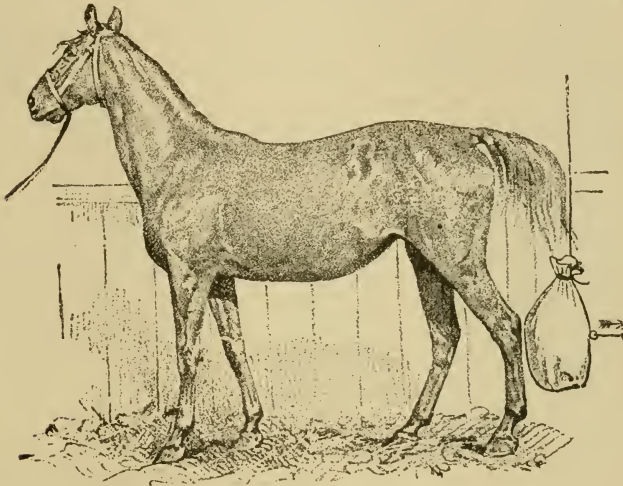
The floor of the loft should be of tightly-fitting, planed and grooved flooring, to prevent the sifting of seeds and dirt below, and especially to keep the effluvia of the stable from rising into the loft.

VIII. An Economical Granary.

The granary of the stable should be in the loft or floor above the stable. This should be a tight room, rat proof, with bins for oats, bran and cut-feed, with chutes from each running to a feed room below, each bin being provided with a proper slide, for giving out or shutting off the grain. The bottom of the bins are better if funnel-shaped, so that the entire contents will run out when necessary. The chutes for grain should be four inches inside. There should also be a room for cut hay and straw, each with its chute, these being not less than twelve inches in diameter, though fifteen is better. Thus it will always be easy to get either cut hay or grain, and it is certainly easier to put the supply at once where it is safe and easily come at, than to take many steps each time you want feed. Besides, it saves grain.

Below them should be a suitable trough for mixing feed, and also a sieve, with a mesh small enough to save any feed grain, for winnowing and cleaning the grain before feeding. The regular feeding of absolutely clean grain has often saved the stable-man the care of serious disorders in his horses.

The cut of stalls we give, and those we have described, are the very best that can be made. It does not follow, however, that they must be made in a costly manner, as written. The good sense of any intelligent farmer may so modify them, that while they are strong, a large outlay need not be made, and yet the principles of utility may be retained. It is the same here as with building. The cheap structure, if strong and economical in the design, may be fully as safe and comfortable as the most expensive. A thing well done is economically done. Illy done it causes waste and loss. If you have no lumber, poles and puncheons, carefully smoothed, answer every purpose. If you are not an adept at framing and must do your own work, strong stakes set in a pretty deep trench, or driven solid, and quite close together, evened at the top, and a cross-piece nailed securely on the top will serve as a manger. The rack may be made of two poles, bored half through with a two inch auger at



A CONTRIVANCE TO BREAK A HORSE OF THE HABIT OF KICKING IN THE STALL. the bottom, and clear through the top piece, with an inch and a half auger, to receive the slats, which may be straight saplings, properly shaved. So, the rear posts may be young trees, six inches in diameter, properly dressed. Thus any inside fixture may be easily arranged, and at light cost by any one ordinarily handy with axe, saw, drawing knife and hammer, as every farmer should be. The device for kicking horses shown, is the one in common use. It is illustrated to show how faulty it is. A far more sensible plan for a kicking horse, if you are so unfortunate as to have one, is to replace the log with a good compact bunch of osage orange brush. This will punish without injuring the horse.

IX. The Wagon and Carriage Floor.

It is good economy to have ample space in the horse-barn in which to keep the carriage, buggy and other more costly vehicles. No one should own a vehicle for pleasure, or even a spring wagon, without proper means of sheltering; and it is needless to say that fowls, pigeons or other birds, are never to be allowed inside the horse-stable and carriage house.

The ordinary farm wagons may be kept under a proper shed, when not in use. If the habit were formed of putting every vehicle in its place, even if to be used again soon, it would be found not to take any more time than to have them left wherever the driver may think proper. In nine cases out of ten they are left just where they are in the way, or else they are exposed to the heat of the sun, or to sudden storms.

X. The Harness Room.

The harness room should be near the carriage floor, and easy of access from the stable, but separated from each by a tight partition. This room, besides containing pegs, or hooks for hanging each harness, should also contain a table for cleaning and oiling harness, and a cupboard for oil, blacking brushes, sponges, tools for mending harness, needles, thread, wax, a saddler's horse, pieces of leather, buckles, etc.

XI. The Stable Yard and Out-Sheds.

The stable yard should be dry and firm, and large enough to properly exercise and train an animal in. It should be protected on every side by a tight fence six feet high. On one side, but not facing in the yard, will be found a good place for the wagon shed. Along one side, and opening into the yard, may be a shed containing feeding troughs at the wall. It will be useful for many purposes.

XII. Grass-Lots Near the Stable.

At least one grass-lot should be near the stable, and, if large enough to be divided into pasture and meadow, so much the better. The pasture will often be wanted to turn a lame or partially disabled animal into, and it is also a good place for the colts to have a run. If there is no spring or stream in the pasture a trough, under shelter, must be provided, and this may be connected with the house-pump by an underground pipe.

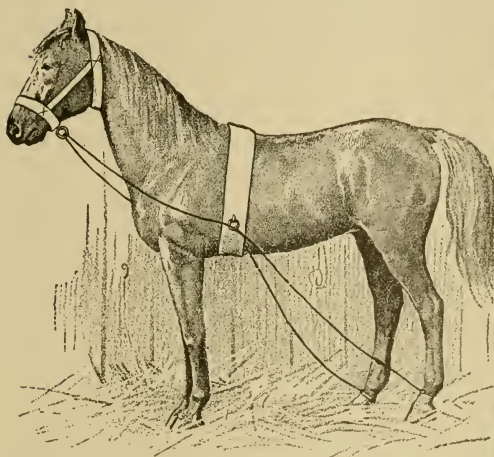
XIII. A Good Supply of Water.

It is essential that a constant supply of fresh water be had at the stable. The best stable buildings are provided with a windmill at the top, and a tank in the loft, to secure the needed water from the nearest well or stream. The tank should be closed tight and should be provided with

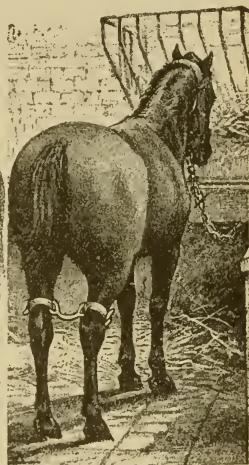
a waste pipe at the top. Another pipe, from the bottom, leads to the stable, with a branch to the place where the carriages are washed. A hose will thus enable you to wash vehicles thoroughly and easily. The windmill and tank may be placed anywhere on an elevation, from which the water may be carried by underground pipes to the stable or to any other part of the premises where it may be wanted.

XIV Cleaning the Stable.

This should always be done at the proper time, twice a day regularly, and oftener if waste matter accumulates. A splint broom will easily sweep away the accumulations of manure, that gather from time to time during the day, and the satisfaction of seeing everything neat and clean will more than compensate for this light extra labor. A stableman should always be held to account for any neglect of this duty.



AN EFFECTIVE HARNESS TO
BREAK A HORSE OF THE
HABIT OF KICKING.



JOINT BAND TO PREVENT
HORSE FROM KICKING
IN THE STALL.

The tools necessary in a stable are two good manure-forks, a hay-fork, brooms, a scraper for pulling away manure, strong pails, sponges, brushes, curry-combs, a card-comb, scrapers for taking the sweat from the body, and plenty of cloths for rubbing the body and limbs of the horses. There should be also provided a thin sheet for every horse in summer, and warm blankets for winter. There should be a full set of tools for cleaning the animals for every two, or at most three, horses kept in the stable.

CHAPTER XIII.

FEEDING, WATERING AND GROOMING.

- I. THE GOOD THAT A SIEVE WILL DO.—II. HOW TO FEED.—III. WHEN TO FEED.—IV. WHAT TO FEED.—V. CONDIMENTS.—VI. HOW TO MAKE MASHES.—VII. HOW TO MAKE GRUEL.—VIII. THE QUANTITY OF GRAIN TO FEED.—IX. HAY AND STRAW.—X. GROOMING.—XI. WHEN TO GROOM.—XII. GENERAL STABLE CARE.—XIII. BLANKETS AND OTHER CLOTHING.

I. The Good that a Sieve Will Do.

There is, of course, such a thing as being too methodical, but more failures result from want of proper attention to the little things that go to make up the whole, than from too minute an attention to details. A competent knowledge of the requirements in every case, combined with accurate judgment to carry each one out according to its relation to the whole, is what marks a man of sensible, methodical habits, by contrast with one who works at random, or neglects some detail that may be of the first importance.

How few farmers, for instance, think it necessary to have a sieve for cleaning the grain which is fed to horses! And yet, this is one of the most important of the minor implements of the stable. The use of a sieve saves cleaning the dirt from the feeding boxes; saves horses the annoyance of swallowing bits of wire and other trash, quite common in these days of automatic binders; saves the teeth of the animals from being broken on gravel, or other hard substances in the grain, and gives one the satisfaction of knowing that the horse is enjoying a meal, clean and wholesome as that of his master. Many careful men wash the grain after it is cleaned from trash in the sieve; which is a most sensible operation, and an easy one, since you have only to drop the sieve partly in water and shake it, or pour a bucket of water over it and let it drain.

II. How to Feed.

A horse must be fed with reference to what he is to do. The horse doing slow but hard and exhausting labor, should have all the clean, sound grain he will eat three times a day, with as much clean, sweet hay at night as he will consume, though we seldom find hay so fine and good that all will be eaten. The grain, during the heat of summer, should be oats, in cooler weather oats and corn, while in winter the corn may constitute fully half the ration.

If cut feed be used, half oats and half corn, ground together, may be used, and this mixed with one-third its bulk, not weight, of bran. When the animals are fed whole grain, this mess should be given two or three times a week, at evening, as a change.

The ordinary farm-horse should be given as much oats as he will eat three times a day, in summer, and be allowed grass or hay at night, in their proper season. When not at work, on Sundays, they are sometimes put upon pasture, and we have known farmers turn out their horses at night to feed. This plan we dislike. The farm-horse has exhausting labor, and should rest in the stable when not at work. The grass at night is good; let the farm-horse have it by all means, but cut and carry it to him.

Horses kept for driving, light pleasure horses, and the business-man's horse, should be fed on sound oats and hay, with a sweet mash of bran once or twice a week. Many persons of this class, turn their horses out to pasture during the summer. Nothing could be more injurious. The animals are eaten up by flies and mosquitos; they get out of condition, and the owner blames the person who has grazed them at so much a week. If they are turned out at night and sheltered during the day, and get half rations of oats, it is not so bad.

The proper time for a horse to have a run at grass is in May and early in June; but the animal should have a little oats daily. A month at grass is amply sufficient.

The full feed for driving horses is from four to six quarts of oats, three times a day, according to size, and as much sound hay as they will eat. Musty grain, musty or dusty oats, gives rise to heaves and other disorders, and should never be fed to any horse. Hence, in using ground feed, be sure that it is made from sound grain. Washing and kiln-drying does not cure musty grain, though it may deceive the unwary. Hence, again, the best plan with all driving horses, and horses for other fast work, is to feed whole grain to them.

III. When to Feed.

A horse should get his feed as regularly as a man. His stomach, like that of a man, is small, and the size has been reduced by artificial breeding and care. Horses doing fast and exhausting work, should be fed grain four times a day; at six and at ten o'clock in the morning, at two in the afternoon and again at night. Carriage horses should also be fed four times a day; but the morning feed need not be until seven or eight o'clock, since the animals are not required to be used, as a rule, before ten. They should be fed again at lunch-time, or as near twelve as possible; also before going out in the afternoon, and again upon their return in the evening; if they bring the family home late, they should also have a feed before being left for the night.

Trotting horses and racing horses should be fed with grain four times a day, and light-feeding animals should have every inducement held out

to get them to eat enough. It is seldom that animals of this kind are too greedy. Their feeding is so regular and their care is so good, that they are seldom inclined to overload their stomachs. If an animal be a glutton he must be restrained to such a quantity of food as will support the labor he is to perform. No horse driven at fast, or to exhaustive work, should be taken out in less than an hour and a half, or two hours after finishing the meal; and it is better for any horse if he have an hour of rest after eating, before returning to work.

IV. What to Feed.

What the feed of horses should be, has been partly stated in the preceding sections. It may be varied somewhat, according to the price of grain. As a rule much cut feed is given to teaming horses, express and dray horses, in cities, especially in large stables, where a methodical system is followed, and intelligent foremen have charge of the different departments. If corn is given as a substitute, in part, for oats, bran should be used with it. Cut feed at night, with oats morning and noon, makes excellent provender for any draft team, including those for farm work. On a number of farms where many horses are used, this is the rule, and a most excellent one it is, during the season of hard labor. In winter, more corn may be fed than oats; and when corn-meal and bran are used, a heaping measure of bran to a stricken measure of meal, is a good proportion.

The intelligent reader will be able to judge, from the suggestions here given, how to regulate the messes. A horse, regularly and fully fed, will seldom eat too much. Now and then it will be necessary to restrain a greedy one. If a horse is given to bolting his grain whole, he should have chopped food, or it must be so managed that he can only pick it up little by little. It is the half-fed horse that founders himself when he gets at the grain bin.

V. Condiments.

It is well to avoid horse condiments, condition powders, and nostrums warranted to cure. On the farm they should not be needed; and if the animal is really ill, the proper treatment of the case will be found further on, in the chapters devoted to diseases. In the cities and larger villages, the advice of a competent veterinary surgeon can now-a-days generally be procured. Arsenic, strychnine and other violent drugs, especially the first named, are much in vogue to give an animal fire and a sleek coat, especially by ignorant persons who pretend to know all about horses. They are ruinous unless used as prescribed by a competent veterinarian. If a horse lacks appetite, rest and a few bran-mashes will generally remedy the trouble. Condition powders are beneficial, if the system is out of

order. Their use, and how to prepare them, will be given in the chapters on the treatment of diseases. Salt is the only true condiment for herbivorous animals. This they should have always before them. They will then take just what is needed and no more.

VI. How to Make Mash.

A sweet mash is made by taking four quarts of good bran, moistening it gradually with hot water, and then adding enough boiling water to bring it to the proper consistency. Cover with a cloth, and when cool enough give it to the horse. A small teaspoonful of salt may be added, if desired.

Another good mash is made by boiling two quarts of ground oats, a pint of flax-seed and a little salt, for three hours. Then mix with it enough bran to bring it to a proper consistency for eating. A half pint of molasses may be added to the water. Cover with a cloth and feed cold. This is the quantity for a horse, and is a good Sunday morning meal when the team is kept on dry food during the rest of the week.

VII. How to Make Gruel.

There is nothing better for a tired horse than gruel; every horse should be taught to drink it. Stir a pint or more of oat-meal gradually into four quarts of cold water. If you have no oatmeal, use half a pint or more, each, of fine corn-meal and flour, according as it is liked, thick or thin. Then fill up the pail, in which it is mixed, with water; stir and give it to the animal at once. Sometimes a dainty horse may be induced to take it, by first giving him a single swallow of water.

Never give a horse solid food when exhausted. If he will not take gruel, try him with hay tea, after having first turned down a quart of good stock ale. Rub him, in any event, until dry, and then give him his feed. By this time he will probably have taken some hay.

Hay Tea.—To make hay tea, fill a bucket with the best of hay, clean and bright. Pour over it enough boiling water to fill the pail. Cover closely to keep in the steam, pressing the hay down occasionally, or put it on the stove to keep it hot while pressing. In fifteen minutes it will be sufficiently steeped. Turn off the water into another bucket, and add enough cold water to make six or seven quarts, and give to the horse when cool enough to drink. It is nourishing and an excellent stimulant for a tired horse.

VIII. The Quantity of Grain to Feed.

Grain should always be fed by weight. If a team require a bushel of oats a day, this will be 36 pounds of sound, clean oats; if the oats are not clean, the bushel will weigh only 32 pounds, or less. If corn is to be substituted, give only a half bushel, or 28 pounds of shelled corn.

to the team at three feeds. If this is not enough, the allowance may be increased to thirty-six pounds. If the corn be on the ear, thirty-five pounds is the weight of the half bushel. In every case a half bushel of corn is the equivalent of each bushel of oats fed. In other words, the stable uses seventy pounds of ear corn, or fifty-six pounds of shelled corn, for every two bushels of oats discontinued. The change, however, should never be made suddenly, but gradually. Barley, rye and wheat are not injurious to the horse, but we must not feed more pounds than the regular ration of the grain previously fed. If ground feed is given, one-fifth less in weight will be required.

IX. Hay and Straw.

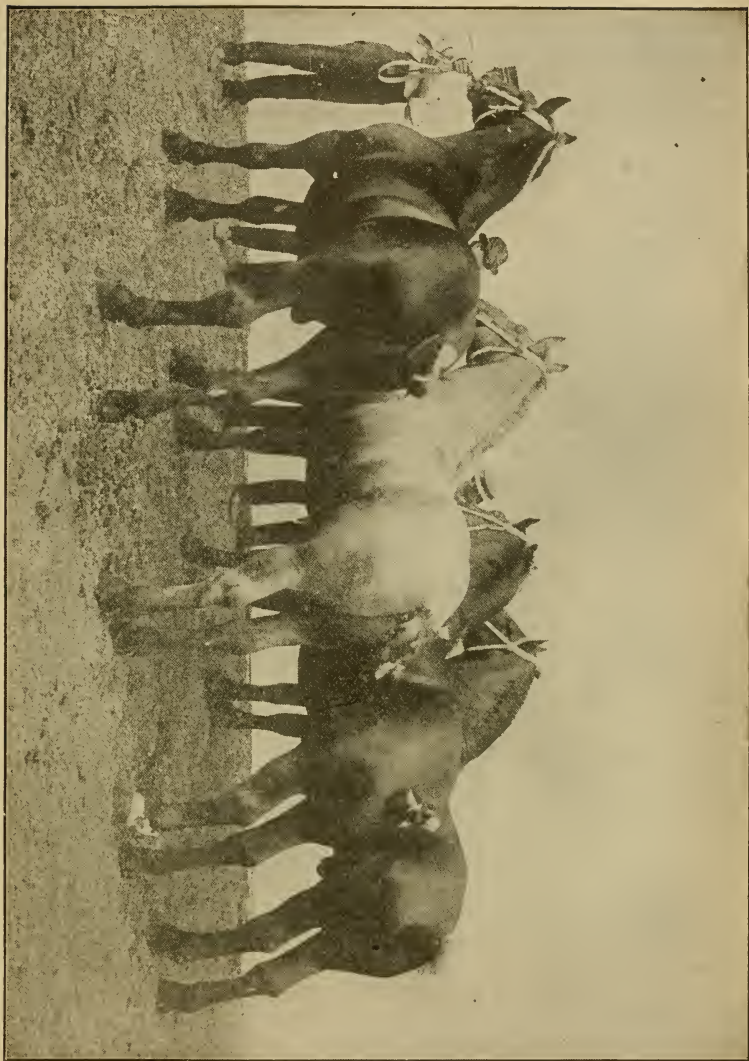
As before stated, none but sound hay should be used. Timothy, Blue grass, (*poa pratensis* or *poa compressa*), Fowl meadow, (*poa serotina*), Orchard grass, (*dactylis glomerata*), and Red Top, all make excellent hay. Clover should never be fed to horses; it is always dusty, and generally badly cured. Hungarian grass, if cut just when in blossom, may be given once a week; if fed constantly, or if too ripe, it acts strongly on the urinary organs.

Straw should always be used for bedding—oat-straw is the best; and a feed of sweet, clean, bright straw is relished occasionally by the horse. We once kept twenty pairs of farm mules all winter on bright straw and corn, with a feed once a week of Hungarian hay, and never had them come through better.

X. Grooming.

Stable tools are to be used, not abused; nor is the animal to be tortured with them. The groom who strikes a horse on the hocks, or other part of the body, with the curry-comb or other stable tool, should be discharged instantly. The groom who uses the curry-comb to the positive discomfort of a horse, or about the joints, should be admonished, and if he persist he should be discharged. The use of the curry-comb is simply to loosen the scurf and dirt, and to clean the brush. The curry-comb should be carried lightly and in circles over the body, and then a good bristle brush should be used to clean the horse. The brush should be used with firm, long strokes, and after every two or three strokes it should be drawn over the comb to free it of dust. Very short-haired and tender-skinned horses require little more than the brush, to be followed with a damp wisp of straw, finishing with cloths. The wisp and cloth should always be used to finish a horse.

If the legs are dirty and wet, they should be washed clean and rubbed dry; if they are dirty, clean them with the brush. Be particular about



REAR VIEW PRIZE WINNING PERCHERONS.
Specially photographed for this work.

the fetlocks, and the long hair of the lower limbs. They must be left both dry and clean.

The mane and tail should never be touched with anything except a coarse-toothed horn comb, and the brush. Brushes are made especially for this purpose.

The feet should always be looked to and cleaned when the horse comes into the stable. He may have picked up a nail, or graveled himself. Whatever injury of this kind he may have sustained should be promptly treated.

XI. When to Groom.

Every day, before going to work, the horse should be thoroughly cleaned. If he comes in dirty at night, he should certainly be cleaned before the master goes to bed. It is an open question among horsemen, whether a horse should be washed when dirty. Our plan is to scrape the body as dry as possible immediately, blanket in cold weather, bandage the legs to keep them warm, and clean when dry. The tired horse should never be placed in a draft of air to cool. If he do not cool kindly, he wants a stimulant, hay tea or gruel. If necessary, he may be walked about in the air; it will both dry and refresh him, unless he be badly used up.

XII. General Stable Care.

Of general stable care we have previously written. The animal should have done for him what he cannot do for himself. It is poor economy to be without any necessary article to properly care for the horse. The ordinary tools have been already indicated. Proper tools for cleaning the stable must be had, and proper implements for cleaning the horse are quite as necessary. The drinking bucket should never be used for washing the horse. When not in use, both drinking and washing buckets should be prevented from falling down. Keep them full of water, and change when necessary, but never mistake the wash bucket for the drinking bucket.

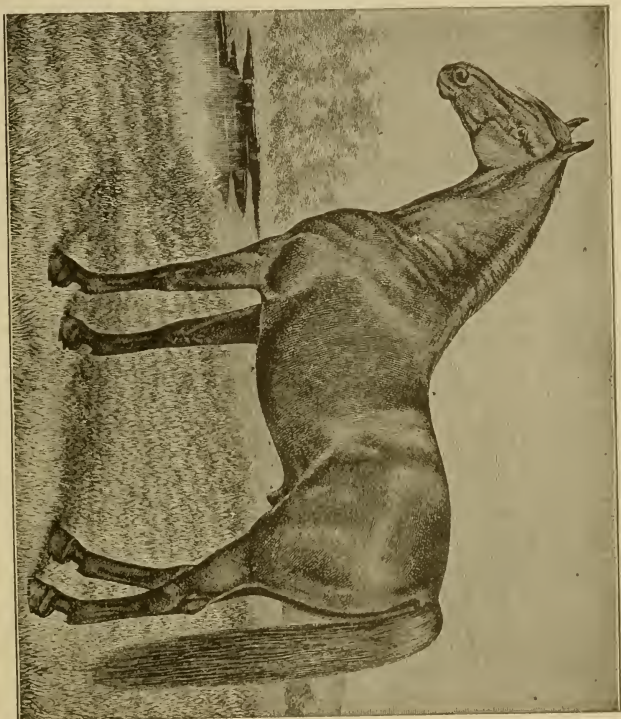
A wheel-barrow is a most useful thing in the stable, and its uses are also various about the place. The list of cleaning tools is a long one, but a horse may be cleaned in the most thorough manner with a good curry-comb, a brush, a wet sponge, a wisp of straw and rubbing cloths. A scraper should always be near for use upon sweaty horses. A section of a flat barrel-hoop will do very well at a pinch.

XIII. Blankets and Other Clothing.

The driving horse should have a summer and a winter stable-blanket, and a summer and winter blanket for the street; also a hood for the head and neck, and other appliances for protecting the limbs, as bandages, etc.

The farm horse requires only a summer and a winter blanket, and a hooded sheet, or good fly net, when driven in summer. Each horse should have his own blanket, plainly marked. If you have them, you will of course use them when necessary. A blanket is of but little use without a surcingle. See that the surcingle is properly buckled, and protected, so it

CLEVELAND BAY STALLION ROYALTY.



will not hurt the horse. Each blanket should have one or two breast straps and buckles, and a proper cord to pass across the buttocks, under the tail, to keep the blanket from moving to one side or the other. We repeat: proper horse clothing is among the most necessary and profitable investments for the stable.

CHAPTER XXIV.

HUMANITY AND COMMON SENSE.

- I. THE ECONOMY OF HUMANE TREATMENT.—II. COMMON SENSE IN ALL THINGS.—III. THRIFT AND UNTHRIFT CONTRASTED.—IV. CRUELTY AND IMPROVIDENCE VS. THRIFT AND KINDNESS.—V. WHY THE HORSE REQUIRES INTELLIGENT MANAGEMENT.—VI. HOW TO KNOW AN INTELLIGENT MASTER.—VII. PICTURES FROM REAL LIFE.—VIII. THE KIND MAN WILL HAVE A WILLING TEAM.—IX. THE "GOOD FELLOWS" CRUELTY.—X. HOW TO USE ONE'S MEANS.

I. The Economy of Humane Treatment.

In the treatment of animals, humanity and common sense are one and the same thing. For, the humane treatment of these dumb creatures not only contributes to their comfort, but promotes their physical welfare and enables the owner to get from them the largest amount of labor that they are capable of. The farm animals, and especially the horses, of a cruel, slovenly or miserly farmer are rarely in condition to perform the most efficient labor. A master, so unthrifty or penurious as to begrudge the proper care and feeding of his animals, is also apt to over-work and under-feed his laborers, and an employer who does this never has efficient help. His hired men, while at work, shirk every duty they can, and at the first opportunity they quit him; and the work that they cannot shirk is done in the most inefficient and slovenly manner. Even if inclined to do their duty they cannot work to the best advantage because the team is unfit. Here, then, we see two causes operating against the grudging or unthrifty farmer—inefficiency in his help and in his animals; whereas, the farmer who has common sense and humanity enough to keep his animals in good condition, has only one possible cause of inefficient labor to guard against, viz: inefficiency in the men he employs. A man of the latter kind, however, will have little difficulty in securing efficient help; whilst the grudging or unthrifty man seldom secures the best labor, because good men will not work for such a master, unless obliged to. Hence, the want of common sense or of humanity always reacts against the individual, and at a loss to himself. The horses of a good farmer are not pampered. His workmen do not expect to be; but the common-sense man will see to it that they are made as comfortable as circumstances will admit; that neither horses nor men are overworked; that the food, both for man and beast, is given in sufficient quantity, and that it is of good quality. Plain, but substantial food, well-cooked, should be provided for the men, and sound grain, plenty of water, careful grooming for the horses; and the eye of the master should also see to it that the animals are not abused by beating. If the horses have not been



IMPORTED GERMAN COACH STALLIONS.

Many Times Prize Winners.—Specially photographed for this work.

broken in spirit, they will not need whipping; for the intelligent master will not long keep dull, lazy brutes, any more than he will employ lazy, shirking men.

II. Common Sense in all Things.

It would show as great a want of common sense to put a pair of colts, intended for fast road-horses, or trotters, or a young animal intended for a high-priced saddle-horse, to continuous and hard draft, as it would to expect extraordinary speed from an ill-bred brute, or from a horse bred solely for draft. Does not the same rule hold good in all transactions? Is it not the result of ignorance, or of a penny-wise and pound-foolish disposition that an inferior animal, of any kind, is ever allowed to be bred for any purpose? Whatever may be the labor that is to be performed, none but the most superior animals for the use, should ever be bred; just as none but the most perfect seed should ever be planted or sown. If the rule were universally adopted of breeding none but the best animals and sowing none but the best seed; and if, in addition, the proper care were observed in the breeding of animals and in the cultivation and saving of crops, the productions of the country might be doubled in three years, from the same acreage, while the average value of farm animals might be more than doubled in ten years. This is the direction of our thoughts when we urge the importance of common sense, intelligence and humane care upon the farm; their exercise brings the largest profit to the master at the lowest cost.

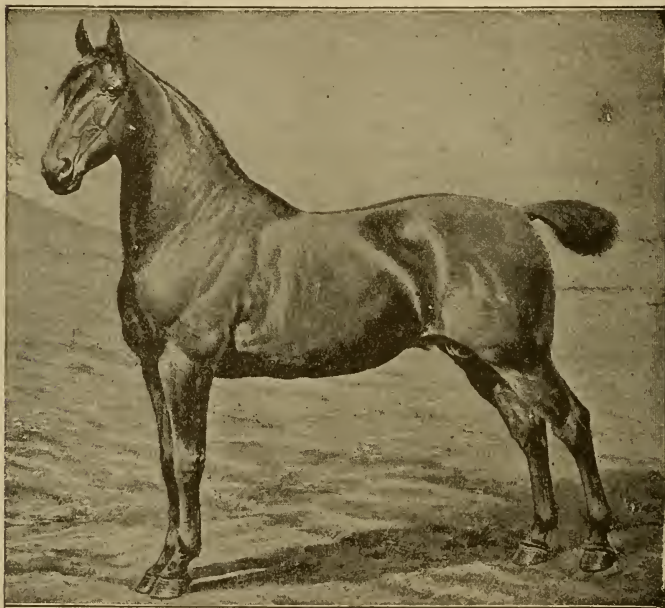
III. Thrift and Unthrift Contrasted.

In the one case we see a shiftless and at the same time cruel and perhaps drunken owner, with a miserable mule and a still more miserable one-eared and one-eyed horse for a team. They would sell simply for the price of their hides. Of course, they do not eat as much as an able team would eat, because they cannot get it. Scant feed is certainly not economy in their case, for the result of their day's work would be not more than an acre scratched over. So much for the unhappy team of a reckless master. This man and his family do not live. They simply exist, and their only mission in life seems to be to reduce the average price of live stock, and the average yield per acre.

Look at the other picture, if you wish to see a thrifty and able master with a handsome and able team, going off as though they meant business. There, also, are the happy children, just come out with the lunch basket; there is nothing miserable here. The master is hard at work increasing the average yield of wheat, and by the exercise of humanity and common sense, raising the average price of farm stock.

IV. Cruelty and Improvidence vs. Thrift and Kindness.

The cruel or improvident man's team stands exposed to flies, or shivering in the street of the village, while the man is guzzling beer or whiskey close by. They stand in their own filth at home, uncleaned, as they are half fed. The team of the kind and thrifty master stands in the stable at home, eating generous provender, when not at labor on the farm, or hauling heavy loads of produce to the market. The animals do not



IMPORTED FRENCH COACH STALLION.

lack blankets when necessary. They have no bony shoulders to be galled. They are not jerked about by the bits, nor are they lashed or beaten with a club while at work. They have simply been trained to obedience, and have been taught something of the English language.

In the streets of our large cities we can see plenty of such teams as we have described, teams both of the cruel and the provident master. On the average farm, we see none of the first kind. They are, happily, confined mainly to a rare class, shiftless, drunken squatters on waste land,

though occasionally such masters are found, as renters, with their worthless brutes on the lands of a landlord too greedy to give an industrious laborer a fair rental for his labor. Do such landlords thrive? Unhappily yes. Sometimes, by denying themselves and families the common or decent necessities of life, and by cheating even the poor knackers whose improvidence has thrown them in their way.

V. Why the Horse Requires Intelligent Management.

It is because horses are intelligent animals. They have a sense of reason, which may be improved by training. They are naturally disposed to rely upon their masters, and this disposition should never be overcome by the fear of injury. They are courageous, and at the same time timid. Their courage should be fostered, since it increases their spirit and decreases their timidity. They fear objects with which they are unfamiliar. Once they learn that an object is harmless, they cease to fear it. Thus they may be accustomed to the sound and sight of a locomotive, one of the most fearful objects to them naturally, and if allowed to satisfy themselves that a locomotive is not dangerous, they will at length want to touch it with the nose; for this is the last means a horse uses to fully satisfy himself that an object will not injure him. Thus satisfied, all further fear of that object is passed.

VI. How to Know an Intelligent Master.

An intelligent master, however poor he may be, will not drive a broken-down, rat-tailed, spavined team, with ears torn away, eyes knocked out, ill-kept and ill-fed. He will not have rusty tools, nor keep a hog-wallow by the side of his door. His wife will not be found pulling down and burning the remnants of a fence, for want of better firewood. His team, indeed, may not be in high flesh. The necessity of extraordinary labor, and plain food, may keep master and horse thin, but there will be intelligent care shown even in poverty. Cunning is not intelligence, neither is brute force power. The intelligent man, however unlearned, may be known by his surroundings, and by the care of his horse, if he is fortunate enough to own one.

It is certain that an unkind man in his family will be brutal to animals.

All horse owners cannot have fine teams, but no man can afford to own a poor team. They must be kept in proper condition for labor, else the owner is losing money on them constantly. All farmers cannot have fine houses and barns, but no farmer should have either cold, or, in other ways, uncomfortable buildings. By studying chapter XII, one may easily learn how to make the cheapest structure comfortable. The illustration on this page fully illustrates an idea of comfort in farm animals.

The horses are not specially fine, but they are in good flesh and well cared for. The master has no fear that they will run away. They are well trained and know they will not be abused, hence they drink contentedly, preparatory to the half-day's plowing expected of them. The barn is a rough structure, but it is well built and thoroughly warm in winter.

VII. Pictures from Real Life.

The surroundings of a man, in any condition in life, are an index to his character. The kind master may have only a stable built of poles, the sides filled in with hay, and the roof of the same material; but it will be comfortable. Health, thrift and care, in the end, will enable him to build better. However poor, there will be method in his labor. He will sow no more crops than his team can properly prepare the ground for, and himself can carefully tend. His debts will not be for useless trumpery, and what tools he has will be in good order. His animals will be no more than can be properly cared for, so that, in the end, his barns and yards may look something like the picture of the shelter of the provident man.

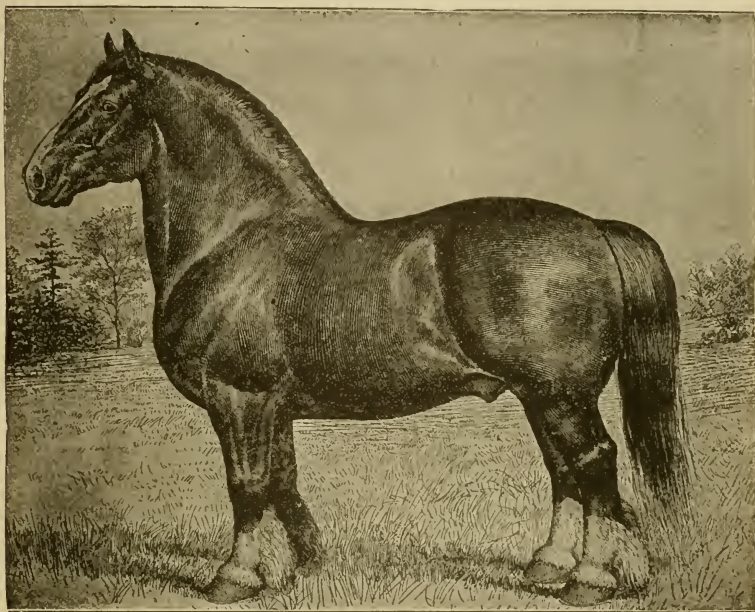
The barn of the improvident man will be dilapidated. The door will be off the hinges, and propped up with rails. There may be some attempt at chinking up cracks. His wagon will stand anywhere in the storm, while his harness will lie handy, perhaps on the tongue of the wagon, or else be flung on the floor of the hovel he calls a barn. His animals will be unsheltered, and allowed to shift for themselves at a neighboring hay stack, yet he will be so fully employed, that he will have no time to do better. He will have no barn filled to the ridge-pole with fodder, no horses, cattle and sheep enjoying themselves in the stables. His pigs can of course shift for themselves entirely. They will be so thin that they can easily slide through any fence near by, within which, indeed, all his stock have probably helped themselves, unless his careful neighbors have made their fences "horse-high, bull-proof and pig-tight."

As to his home, it may look something like the picture, airy in summer, but not comfortable in winter—for a brush-pile, eked out with bark torn from the fences, does not make generous fuel. Dear reader, have you not recognized the picture in your travels? Have not some of us seen the same thing near home?

The home of the intelligent and thrifty man will in time come to look like the one shown in the illustration of kindness and common sense exemplified. At all events, however humble, neatness and good care will be apparent everywhere.

VIII. The Kind Man will have a Willing Team.

The team of the considerate man, if they unfortunately become chafed by the harness, when away from home, in a storm, are immediately attended to. They are kept warm, dry and clean; and however tired at night, are always ready for work the next day, because they have rested in plenty of clean straw, with plenty to eat. If the master's means will



IMPORTED ENGLISH SHIRE STALLION, HOLLAND MAJOR.

permit, they will be lordly looking animals, not unlike the picture of a kind man's team.

At all events, they will not resemble a cruel man's team, with ribs showing like bean-poles, and themselves the pictures of hunger, gazing at an empty bucket,—or at least, a bucket empty except for the air it contains.

IX. The "Good Fellow's" Cruelty.

There is another class, known as good fellows, whose time is so taken up helping their friends, that they never have leisure to care for anything

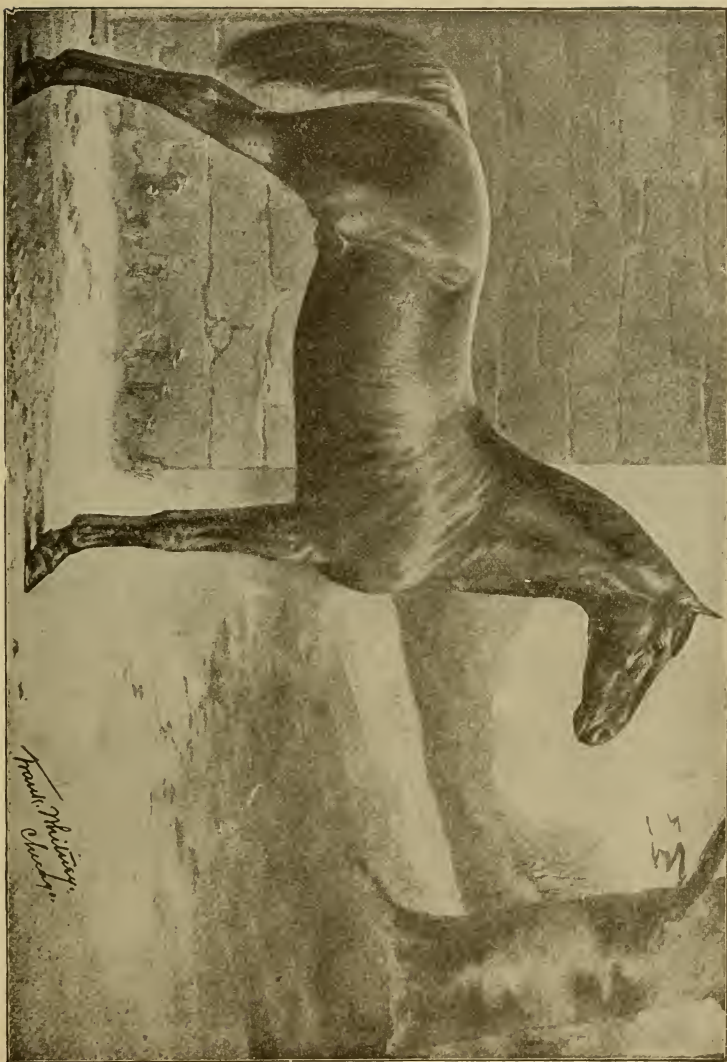
at home. They have time to hunt and fish, to play cards and drink. When they work, they work very hard, and are generally so used up, both man and team, that they require rest for several days. These "good fellows" often own but one horse, and borrow some other "good fellow's" horse to "splice a team." Their borrowings are extensive, and their more intelligent, because more careful, neighbors lend, for the sake of the poor family at home. Some people would call them lazy; perhaps this is as good a name for it as any other. They certainly do not work when they can avoid it. They do not think themselves cruel. Are they not? Yes, cruel in their neglect at home. The "good fellow's" surroundings may be shown in three pictures. First is seen his barn, if he has a barn, with his sorry old horse mournfully contemplating the chances for the coming winter. He has a house? Yes, we show a corner of it, and his door yard gate. He has, perhaps, a farm, or has hired a part of some richer good fellow's farm. Here is the other good fellow's field gate, and himself coming home after having had a good time. If too tipsy to open the gate, it will not be difficult to push it over.

X. How to use One's Means.

This chapter may not, perhaps, be altogether practical, except in the sense of showing the impractical, and the folly of neglecting to use the means which any man may have. All cannot own fine teams; all cannot own strong teams, but every man who owns a team of any kind, should keep it in a condition for labor. The man who is improvident in the neglect of his farm and stock, is improvident in the underlying principle upon which all else rests. Hence, the pictorial story of thrift and unthrift may not come amiss; and the thrifty man who buys this book, may become an angel in disguise, if he will lend it to his unthrifty neighbor. It may be the means of mending his ways. The unthrifty man we have depicted seldom sees books—his family almost never, unless they be loaned to them. May-be it will teach the use of means at his command, to improve his condition. If so, it will be a beneficent work that will give comfort to some animals, by improving their masters.

All bad masters, however, are not improvident, in the sense we have last shown; but whether improvident, niggardly, selfish, cruel or brutal, the amendment cannot but do good to themselves, their families, and to the dumb animals under their care. The improvement will put money in their pockets, because none of the vices arise from intelligence properly directed, though many of them proceed from perverted intelligence.

In preventing the growth and spread of vice, every man may increase the measure of intelligent endeavor. And intelligent endeavor is always the easiest road to success in any walk in life. And, again, the intelligent treatment of brutes is not the least of the human virtues.



UNDEFEATED YEARLING SADDLE-BRED STALLION, GOODWIN 1927.



A CHOICE PARK HORSE—MANY TIMES A BLUE RIBBON WINNER.

This is a horse of extremely high action. Such horses are seldom as stockily built as other carriage horses. The prime essential of the Park Horse is that he should be high acting both at knees and hocks. As well as being high, the action should be straight forward and open without winging or interfering. The action should be regular as if the feet were put down in rhythmical order. On account of extremely high action a great amount of speed is seldom secured. Height of this horse, 15-3 hands; weight, 1100 pounds.

The demand for park horses greatly exceeds the supply, as they have never been produced in great enough numbers to equal the demand and probably never will be. Breeders trying to produce them succeed with only a small percentage of the colts reared.

Park horses possess much of the coach horse type in that they must be symmetrical, with well rounded bodies and an abundance of quality and action. In reality, they are the "cream" of the small coach horse. They are strictly a dress horse and as their name indicates one which a lady or gentleman would want to drive in a park, and are hitched singly to a cart or tandem or to a gig. A solid color is more desirable than one with white markings. It is not considered in good taste for a lady to drive a strikingly marked, extremely high acting horse.

CHAPTER XV.

HOW TO BUY AND SELL A HORSE.

I. ACCURATE KNOWLEDGE NECESSARY.—II. BUYING CHEAP HORSES.—III. A GUARANTEE OF SOUNDNESS.—IV. KNOW WHAT YOU BUY FOR.—V. THE PROPORTIONS OF THE HORSE.—VI. DESCRIPTION OF ECLIPSE.—VII. WHAT CONSTITUTES A GOOD HORSE.—VIII. MODELS FOR BUYING.—IX. THE RACING AND THE TROT-TING FORM.—X. THE ROADSTER.—XI. SADDLE HORSES.—XII. A HORSE OF HIGH FORM.—XIII. BUYING FOR BLOOD.—XIV. CHOOSING THE BROOD MARE.—XV. SELECTING THE STALLION.—XVI. HOW TO DETECT VICES AND DEFECTS.—XVII. SOME FAULTS AND IMPERFECTIONS.—XVIII. WHAT IS UNSOUNDNESS?—XIX. BLEMISHES.

I. Accurate Knowledge Necessary.

The value of correct information in trading is no where greater than in buying a horse, with a view to his future use. There is so much to be guarded against in selecting an animal of good physical proportions for the labor intended; so many vices, the result of bad breeding, or of abuse by previous owners; so much unsoundness occasioned by hereditary transmission, by overwork, hard driving, or neglect; so many defects which dishonest intelligence may cover up for the time being, that the purchaser must have been a close student and a keen observer to be able to guard against them all. In fact, no man can do so without a trial of the horse, in addition to the exercise of critical judgment.

In Chapters II, III, IV, and more especially in Chapter V, we have given illustrations and directions covering many important points. In the chapters relating to veterinary, others will be found. In this chapter, we shall go thoroughly over the ground not elsewhere covered.

II. Buying Cheap Horses.

The mania for buying cheap horses, or rather for getting an animal for much less than his actual value, is a weakness of such a large number of persons, that it is no wonder there are so many bad horses in the hands of farmers. Their means are often small, and, desiring to get as much as possible for their money, without being prepared to judge correctly the parts of an animal, they are often duped by designing men. And, having thus been taken in, the animal, as a rule, must indeed be a sorry one if the victim does not in turn practice the same deceit upon another. To avoid being swindled, it is a good and safe rule to distrust any horse that is offered for much less than his apparent value. An animal thus offered has generally been dishonestly come-by, has some unsoundness, is vicious in some way, or has some defect known to the seller and not represented. Hence, a guarantee should always be taken, unless the price paid is sufficiently low to cover all possible defects. Moreover,

never buy a horse of a man whom you do not know to be responsible, for unless the seller is a resident, and solvent, his guarantee is, of course, worthless.

III. A Guarantee of Soundness.

When a horse is bought on a guarantee, the article should be concise, and yet comprehensive. Unnecessary verbiage often causes litigation, and long forms are frequently written by scoundrels to deceive. A form like the following will cover the ground :

*Received of Mr. _____, _____ Dollars for
warranted _____ years old, and under _____ years, sound, free from vice, and
quiet to ride or drive.*

Signature.

The place and date of purchase, the name of the person who pays, the amount paid, the description of the animal with pedigree, if any, and reference to the proper stud book, and the age, should be filled out and signed by the seller. Insert the names and the guarantee might read as follows :

*Received, St. Louis, Mo., January 1, _____, of James Cashman,
Eight hundred and fifty (850) dollars for the dapple bay imported stallion Fearnought, black mane and tail, and two white hind fetlocks. Sire Stakeholder, dam Surprise, etc., as contained in the stud book. Said stallion is warranted five years old, and under six years, sound, free from physical defect, and safe and quiet to ride or drive.*

(Signed) Alexander A. Horseman.

This form clearly covers the ground, and may be altered to suit any transaction in buying a horse.

A bill of sale may read as follows :

St. Louis, Mo., January 1, _____.

For and in consideration of the sum of _____ dollars, [or, if a note is given for the whole or part, state this fact.] I have this day sold to James Cashman the horse, etc., etc., [as in the other form.]

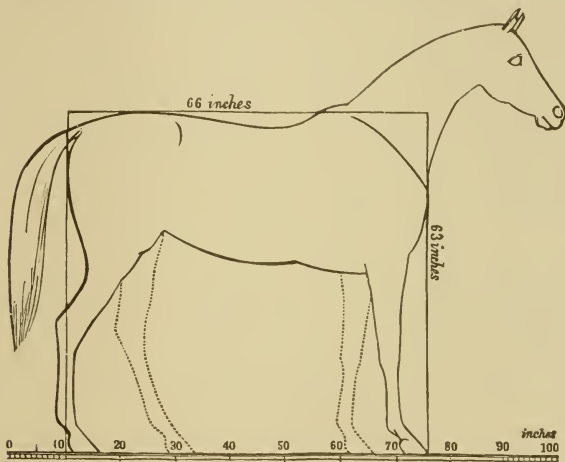
IV. Know What You Buy For.

The buyer must have a definite idea what he is buying for. If for work, the horse should be large, able, a good walker, and strong all over. See cuts of draft horses, and horses of all work. If for the carriage, he should have fine style and action. If for speed, this must be known. If for breeding, the particular use to which the offspring is to be put must be duly considered ; if for breeding racing horses, the pedigree must be without a flaw ; if for use where speed of any kind is desired, the pedigree should not be neglected ; if for trotting, the pedigree should trace to trotting blood. And so of particular breeds, the genealogy of

the horse must be distinct, and the buyer must have accurate knowledge of pedigrees, or else must know that the seller is solvent and a man of his word. There must be no guess work or anything left to chance, in any animal bought for breeding a particular strain. For, once a mistake is made in breeding, the eradication, theoretically, can never be compassed. Practically, it will take a long time so to work out the false trait that the peculiarity will not be apt to appear again. On this point, the reader would do well to refer to what is said on Atavism and Heredity.

V. The Proportions of the Horse.

To assist in judging the horse, we give an outline indicating the proportion of the several parts. This, says Mr. J. H. Walsh (Stonehenge) one of the most graphic and correct of English authorities on the horse, combines the average of six horses selected for perfect symmetry, and taken, two of them from celebrated stallions, two from thoroughbred hunters, and two from chargers of great value. This, therefore, will not apply to draft horses, yet it will be found that the nearer the general utility horse comes to the measurements, the better he will be.



SCALE OF MEASUREMENTS.

	INCHES
Height.....	63
Length from shoulder-point to quarter.	66
From the lowest part of the chest to the ground.....	36
From the elbow-point to the ground.....	39
From the withers to the poll, just behind the ears, in a straight line....	30
The same measured along the crest.....	32
Length of head.....	22

	INCHES.
Width across the forehead.....	9 1-2
From the withers to the hip.....	22
From the stifle to the point of the hock, in the attitude shown in the plan.....	29
From the root of the tail to the stifle-joint.....	26
From the point of the hock to the ground.....	22 1-2
Length of arm from the elbow to the pisiform bone (the rear bone of those forming the upper articulation of the knee).....	19 1-2
From the pisiform bone to the ground.....	19 1-2
Girth varies from.....	78 to 79
Circumference of fore-cannon bone (large metacarpal or shank bone, extending from the knee to the fetlock).....	7 1-2, 8, 8, 8 1-2 and 9
Circumference of arm just below the elbow.....	16 1-2 to 18

VI. Description of Eclipse.

That wonderful horse, Eclipse, differed essentially from this model. His head was of the average length in the six horses above, but was of extraordinary width across the eyes—said to have been twelve inches. He was very low before and yet was 66 inches in height. As Mr. Percival sums him up, “he was a big horse in every sense of the word; he was tall in stature, lengthy and capacious in body, and large in his limbs. For a big horse, his head was small, and partook of the Arabian character. His neck was unusually long. His shoulders were strong, sufficiently oblique, and though not remarkable for, not deficient in, depth. His chest was circular. He rose very little in his withers, being higher behind than before. His back was lengthy, and, over the loins, roached. His quarters were straight, square and extended. His limbs were lengthy and broad, and his joints large. In particular, his arms and thighs were long and muscular, and his knees and hocks broad and well-formed.” As a weight-carrying, swift, long-distance racer it is not probable that his equal will soon again be seen. He was a phenomenon.

For racing, and especially for leaping, and for saddle horses, select the superior points of Eclipse, as many of them as you can find, leaving out the low withers. Except for draft, the horse that will come nearest to the points we have named, will be sure to give satisfaction.

VII. What Constitutes a Good Horse.

It is the ability to perform in the best manner the particular labor for which he is intended, that constitutes a good horse. Within the last fifty years, and especially within the last thirty years, particular attention has been paid to the breeding of animals especially adapted to draft, to the road, to use as fine carriage horses, and to trotting. The race horse, the saddle horse, and the hunting horse may be said to have attained about as high a degree of perfection as man is able to give them.

The fine roadster, the trotting horse and the horse for general utility, may yet be much improved. Within the last ten years the speed of the trotting horse has been greatly developed. In 1880, Maud S. made a mile in 2:10 $\frac{1}{2}$, thus beating the record of 2:14 made by Goldsmith Maid in 1874, and in 1881 we saw her trot two heats in 2:11 and 2:11 $\frac{3}{4}$, the fastest two heats ever made.* We also saw Little Brown Jug pace a mile in 2:13. There are now a number of horses that can trot the mile in 2:15, and not a few that can do it inside of 2:20.

Where the limit of speed for trotters is, or how near they may yet come to the fastest running time, no one, of course, can tell. In buying a horse to breed colts for fast time, great attention must be paid not only to form, but to the pedigree as well. You may breed fast horses from those of good pedigree, though they do not themselves possess extraordinary speed. But you cannot breed fast horses from those which have no pedigree, however good their apparent form may be.

VIII. Models for Buying.

For reasons heretofore given, we have insisted that, to judge correctly the merits of a horse, one must have accurate knowledge—knowledge not only of what constitutes general excellence in horses, but minute and familiar knowledge of the qualities which fit them to perform in the best manner, the various services required. Knowing the great value of object lessons, we have not only presented numerous general forms, showing proportion, muscular development and anatomy, but have also given faithful representations of the more celebrated breeds. If you find an animal of the particular breed, conforming to the standard, do not fear to buy if you wish one from which to breed.

IX. The Racing and the Trotting Form.

As a model for study in racing form, the illustration we give is good. The illustration of the American thoroughbred in Chapter VII, may also be referred to in this connection. In Chapter VIII, some of the best trotting forms are shown, and explicit information about trotting horses is there given. The racing horse should be from 15 $\frac{1}{2}$ to 16 hands high, muscular all over, short-backed, round-bodied, with long hips and deep and oblique shoulders; the head clean and the neck rangy and well set on. The limbs should be clean-cut, sound and firm in the bone,—not small and slender by any means,—and the eyes especially should be full, bright and clear, but mild, denoting, with the broad forehead, high courage and energy, combined with docility of temper.

X. The Roadster.

Roadsters must possess so many valuable qualities, good size, fine action, elegant carriage, high form, docility, and undoubted bottom, that

* Maud S. has since trotted a mile in 2:10 $\frac{1}{4}$.

it is difficult to define their distinct points, *seriatim*. A sixteen-hand mare, handsome and fairly bred, generally brings first-class roadsters, when stunted to good trotting sires. If you are going to breed them, select

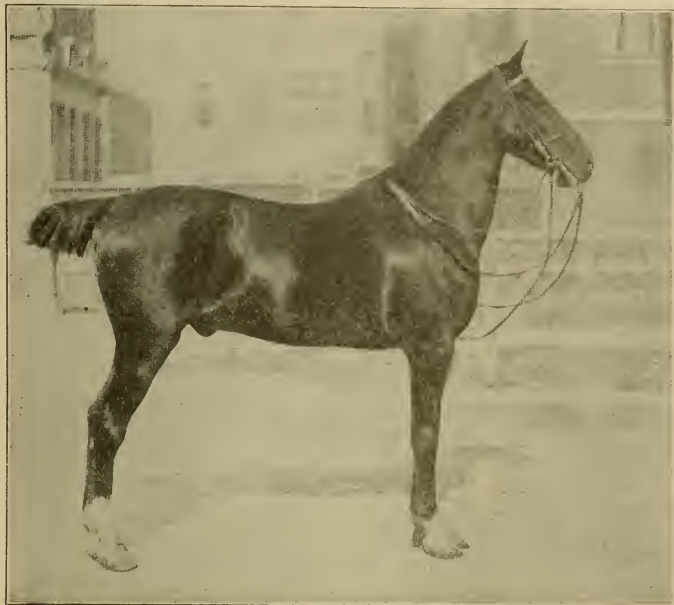


LINDEN TREE.
The Famous Horse Presented to General Grant by the Sultan of Turkey.

those that come nearest to the forms we give. If you are going to buy for use on the road, select the form to correspond to the models, and then insist upon a thorough and extended trial, and take a guarantee before you pay a high price for one or a pair.

XI. Saddle Horses.

The saddle horse is the most difficult of all to get in perfection, except the fastest turf and trotting horses. They must be handsome, large enough to carry the weight easily, be perfectly trained; and then the



A CHOICE THREE-GAITED SADDLER.

This is an excellent type for carrying weight. Note the long, oblique shoulders, the high withers, short, strong back and loins. This horse is a little coarse and heavy in the throat latch, but otherwise a good model. Weight, about 1125 pounds. The "walk, trot and canter," are the three gaits of this class of saddler, and in general type and conformation, they are much the same as the five-gaited horse, but are required to go only three gaits. A good point to be looked for in a three-gaited horse, or all saddle horses for that matter, is to get a conformation that will place the rider well back, showing as much of the horse in front of him as possible; thus lightening the weight on the forehead. The "walk, trot and canter" horse is strictly an English type, which has become popular in America in recent years.

better the breeding, the more valuable they are. The illustration on the next page shows a good form for a model, if the horse is to be used both for driving and for the saddle—one that will perform well, look well and not easily tire. Such a horse will, upon mares of high style but rather light in the limb, and perhaps with the pasterns somewhat

too weak, get high-caste, easily-trained, flexible goers, that will sell anywhere. And those not of perfect form for the saddle will make good driving horses, or good horses for general utility; for it must be remembered, that, whatever the breed, only comparatively a few may be trained



MATCHLESS OF LONDEBORO', AT REST.

to a degree approaching perfection. But, the better the stock, the more perfect animals the breeder will secure.

XII. A Horse of High Form.

For fine action, high form, ability to carry weight and good performance, especially in the hunting field, a horse at least three-quarters



FRENCH COACH HORSES.

Noted Prize Winners.—Specially photographed for this work.

bred is to be preferred. The taste for hunting is largely indulged in in the South, and, as wealth increases, it will become more and more fashionable in the West. In fact, the demand for horses of high form and



A CHOICE EXPRESS DELIVERY HORSE.

Note the conformation of great physical endurance indicated by his obliquely set shoulder, depth and compactness of body, shortness of back, closeness of coupling, unusual length of croup, well set pasterns and good shaped feet. Height, 16 hands; weight, 1450 pounds.

A typical express horse is rather an up-standing, deep bodied, closely coupled horse with good bone, an abundance of quality, energy and spirit. He should stand from 15-3 to 16-2 hands high and weigh from 1350 to 1500 pounds in good flesh. The average express horse is about 16 hands high and weighs about 1400 pounds in working condition. His head should be neat, his neck of good length and crest well developed. His shoulders should be obliquely set, coupled with a short, well muscled back and strong loin. His croup should be broad, rounding and well muscled, his quarters deep and thighs broad. He should not be "goose-rumped" nor cut up in the flank. His underpinning should be of the very best, his canons broad and clean and hoofs of a dense, tough horn of a waxy nature. The horse above shown is typical of that class and practically a perfect sample.

breeding, for saddle use, is increasing in the West, and many Kentucky and Tennessee horses are bought for this purpose. It must be confessed, that as a rule they are not as good as they ought to be, many of

them ranging as under-sized. Colts from a "horse of good form and action," on proper mares, staunch, handsome and well-bred, will turn out to be the animals desired.

Such a horse will have a great stride, fine leaping powers, and the bottom to carry weight at high speed. It must be admitted, also, that such a stallion, when found, would cost a rather large sum of money; but the colts would sell correspondingly well.

Why should not every well-to-do farmer, who breeds horses, breed good ones, and for a particular purpose?

There is no reason why he should not have a well-trained and well-bred saddle horse to sell, when called for.

There is no finer country for training than the West and the Southwest, and the training could easily go on during the use of the colt. If the reader has given close attention to the chapter on training, the ability to succeed will come with practice. But do not try to make a good saddle horse out of a "plug." It cannot be done!

XIII. Buying for Blood.

A person who buys blooded horses with a view to breeding must not only understand the form and the various other qualities that go to make a good horse, as we have described them, but he must also understand pedigrees, or else depend upon some friend who does. There are about as many chances of raising a crack colt from the ordinary thoroughbred, even of unstained lineage, as there are of drawing a prize in a lottery. The sire and dam must not only be of perfect lineage, but the descent must be direct through a line of winning horses. Such sires are not numerous, and are in the hands of but few breeders. The well-to-do farmer cannot expect to compete with them, but he can secure blood that will improve his stock yearly, and give him many fine saddle-horses; and, those likely to fail as saddle nags will make handsome and fast-selling horses for general work on the road.

XIV. Choosing the Brood-Mare.

In buying a brood-mare the first thing to be considered is her blood; next her development; next her freedom from disability and disease, which latter is called soundness. Last, but not least, her temper must be carefully looked to. A fretful, ill-tempered mare is totally unfit to breed from; and yet, undoubtedly, a majority of farmers consider a mare good enough to breed from, even when worn out with work. A well-bred mare of this kind is certainly more fit than one of ill breeding and badly developed, or one balky from bad temper, or suffering from hereditary disease. A sensible breeder will reject all mares of this kind.

The Value of Partly-Bred Horses.—The real value of all draft, as well as speed, horses lies in their crosses and grades. When bred on roomy mares the half bloods make magnificent animals. losing, it is true, much



A CHOICE SOUTHERN CHUNK.

Note the quality and finish and the absence of draft horse blood. A little more depth of flank would improve her appearance. Southern Chunks, as they are termed in some markets, are small horses that are bought by dealers for the southern markets. They are used by southern planters for tilling their lands and for riding and driving. The southern farmer does not cultivate deeply and the soils are light, consequently, he does not require very large horses.

Southern Chunks are small horses, standing from 15 to 15-3 hands high and weighing from 800 to 1250 pounds. They are rather fine of bone, possessing an abundance of quality and are more rangy in conformation than any of the other Chunks, having more of the light horse blood.

of the wonderful appearance of strength, as shown in the original breed, whatever it may be; but if they lose in this respect, they become finer, as the uncritical would view it—really so, when bred upon good blooded mares.

In the half-bred Clydesdales, as seen in the accompanying illustrations, the limbs are finer and much of the shaggy covering of the limbs is lost. The breadth of the forehead is well preserved, also the strong, handsomely supported neck, the fine shoulder and breast, the length of arm, the short leg below the knee, the strong fetlocks and hoofs, and the round-barreled, well-ribbed body and fine loin.



A CHOICE HEAVY DRAFTER OF THE SHOW RING ORDER.

For several years he was a First Prize Winner at the International Live Stock Show at Chicago. Note his abundance of quality, smoothness of finish, obliquity of shoulder, and correctly set pastern. For hard service a little more depth of body would be desirable. His height is 17 hands and his weight 2150 pounds.

This is the class of draft horse used by wholesale mercantile houses, packers, brewers, coal dealers, contractors, lumbermen, and firms having heavy teaming work. They are in demand in all large cities. They are wanted also for export, but during the past few years prices have been too high in the United States to make exportation profitable and consequently but few draft horses have been exported. The supply is much short of the demand, causing sharp competition, and consequently Drafters are bringing good prices on the open market and the indications are favorable to permanent, active demand and permanent high prices.

In the rear view of the same gelding, is shown clearly the excellent eye and prominent brow, the fine neck, the active, pointed ear, the great power of limb, the broad quarters, the muscular thighs, and handsome tail. Such animals will sell any where.

XV. Selecting the Stallion.

Stonehenge says:—"In choosing the particular blood which will suit any given mare, my impression always would be, that it is desirable to fix upon the best strain in her pedigree, if not already twice bred in-and-in, and then to put to her the best stallion available of that blood. In some cases, of course, it will happen that the second best strain will answer better, because there happens to be a better horse of that blood to be had than of the superior strain, which would otherwise be preferred. If, on the other hand, the mare has already been in-bred to the extent of two degrees, then a cross will be advisable; but I am much inclined to believe, from the success of certain well-known cases, that even then a cross into blood already existing in the mare, but not recently in-bred nor used more than once, will sometimes answer."

Traits of Sire and Foal.—"The choice of particular stallions, as dependent upon their formation, is not less difficult than that of the mare, and it must be guided by nearly the same principles, except that there is no occasion for any framework especially calculated for nourishing and containing the fœtus, as in her case. As far as possible the horse should be the counterpart of what is desired in the produce, though sometimes it may be necessary to select an animal of a breed slightly exaggerating the peculiarity which is sought for, especially when that is not connected with a preponderance of fore or hind-quarters. Thus, if the mare is very leggy, a more than usually short-legged horse may be selected, or if her neck is too short or too long, an animal with this organ particularly long, or the reverse, as the case may be, should be sought out. But in all cases it is dangerous to attempt too sudden alteration with regard to size, as the effort will generally end in a colt without a due proportion of parts, and therefore more or less awkward and unwieldy."

Sound Animals.—"In constitution and general health, the same remarks exactly apply to the horse as the mare. All hereditary diseases are to be avoided as far as possible, though few horses are to be met with entirely free from all kinds of unsoundness, some the effects of severe training, and others resulting from actual disease, occurring from other causes. With regard to fatness, there is an extraordinary desire for horses absolutely loaded with fat, just as there formerly was for over-fed oxen at Christmas. It is quite true that the presence of a moderate quantity of fat is a sign of a good constitution, but, like all other good qualities, it may be carried to excess, so as to produce disease; and just as there is often hypertrophy, or excess of nourishment of the heart, or any bony parts, so is there often a like superabundance of fat, causing

obstruction to the due performance of the animal functions, and often ending in premature death. This is in great measure owing to want of exercise, but also to over-stimulating food; and the breeder who wishes his horse to last, and also to get good stock, should take especial care that he has enough of the one and not too much of the other."

XVI. Vices and Disabilities, and How to Know Them.

A horse is reduced in value, in proportion to his disability for labor or other use. A blind horse will do as much work in a horse power as one that can see. For any labor where sight is required, he is practically useless. A horse "dead lame" is useless anywhere. Unsoundness is a disability. Vices are dangerous, and defects also detract from the price of the animal, and, as in the case of stumbling, are also dangerous. Balking, backing, kicking, pulling at the halter, running away, rearing, shying, etc., are vices, and all of them dangerous ones. Crib-biting, the tail turned to one side, stumbling, etc., are defects, and more or less serious, according to the use to which the horse is to be put. For the saddle a stumbler, among defective horses, is next in danger to the horse with the vice of backing. Then follows probably shying, which is a vice if occasioned by bad usage of the trainer, or a defect if occasioned by weak eyes or cowardice.

Youatt notes vices as follows:

1.—*Restiveness*.—"The most annoying and the most dangerous of all. Whenever it appears in the form of kicking, or rearing, or bolting, or in any way that threatens danger to the horse, it rarely admits of a cure," This is really the starting point of nearly all the vices of the horse, and generally ends in some one or more determined vices, more often perhaps in difficulty of shoeing, from the brutality of the smith. The cure is difficult. The prevention of nearly every kind of vice may be accomplished by firm, temperate, and yet kind management.

2.—*Backing or Gibbing*.—"These are so closely allied that it is not easy to separate them. It is frequently the effect of bad breaking. To detect, rouse the temper of the animal.

3.—*Biting*.—"There is no cure. It is caused by foolish or timid masters or servants, in handling a bad tempered horse. The biter will usually throw back his ears, when approached by a stranger.

4.—*Getting the Cheek of the Bit Into the Mouth*.—"This is to be detected by bridling the horse, and enticing the movement of the mouth. It is not serious, since a round leather guard on the inside of the cheek of the bit will prevent the vice.

5.—*Kicking*.—"Examine the horse for swelled hocks, or other injury about the hind legs. Examine the stall for marks of kicking. Notice if

the horse remains kind, when a strap is placed under the tail. A kicker in harness should never be tolerated.

6.—*Unsteadiness While Being Mounted*.—"This may be from eagerness to start, or from irritability. The first is unpleasant, the latter dangerous. When confirmed, it is a vice. The prevention is never to allow a horse to start until the word is given. Firmness and gentleness in training must be observed.

7.—*Rearing*.—"This is always unpleasant, and, when confirmed, most dangerous. It is usually caused by a sharp curb in the hands of an unpracticed rider. Drawing the horse up suddenly before starting him, is the usual test.

8.—*Running Away*.—"Once the habit is confirmed, there is no cure. And once running away, the horse seldom forgets the vice. A good horseman may manage such a horse under the saddle, with a sharp curb. In harness, the horse is dangerous to the best of drivers. It is difficult to detect. Laceration of the mouth, bruises and scars, are indications.

9.—*Shying*.—"This can only be detected by trial. If occasioned by cowardice, or from weak eyes or near-sightedness, it is dangerous. If from playfulness, it may be cured by firmness and gentleness.

10.—*Vicious to Shoe*.—"This is caused by timidity or brutality in the shoer, with young horses. If confirmed, it will be shown when a shoer, strange to the horse, handles him."

XVII. Minor Disabilities.

Among defects, that may, or may not—some of them—be classed as vices, are the following, condensed from Youatt:

1.—*Crib-Biting and Wind-Sucking*.—They are analogous to each other. The first is gripping any hard substance, with contraction of the windpipe, the other a violent sucking motion, attended with a peculiar sound.

2.—*Cutting*.—The marks will be shown. Proper shoeing will often remedy this. If not, boots or other artificial appliances must be used.

3.—*Not Lying Down*.—A serious disability to a hard-worked horse. Give such horses a loose box, good, evenly laid bedding, and plenty of room.

4.—*Overreach*.—Striking one shoe with the other. A heavy shoe, or toe-weights forward, will sometimes remedy this. If in old horses, it may amount to a serious and dangerous disability. Young horses may outgrow it.

5.—*Pawing*.—A serious defect, or vice, of irritable horses. There is no remedy save confining the fore feet.

6.—*Quidding, and Swallowing the Food Without Grinding.*—The first is occasioned by bad teeth, or disease, as sore throat, catarrh, etc. The latter from the same cause, or greediness. The cause must be removed. In the case of greediness, it is difficult.

7.—*Rolling in the Stable.*—More a vice than a disability. It may be either. A horse inclined to roll, should always be given the end of the halter in a straw yard, before being tied in the stall. Rolling in the stable is a vice dangerous to the horse.

8.—*Slipping the Halter.*—A trick of which a horse can never be cured. The remedy is a halter that cannot be rubbed off, or a strong loose box that cannot be broken down.

9.—*Stumbling and Tripping.*—A disability, that by bad usage and punishment may become a vice. It is always dangerous, and the result of infirmity. The only test is trial over rough ground. Some horses, however, are more apt to trip on even than on rough ground.

10.—*Weaving* “consists in a motion of the head, neck and body, from side to side, like the shuttle of a weaver passing through the web, and hence the name which is given to this peculiar and incessant motion. It indicates an impatient, irritable temper, and a dislike to the confinement of the stable; and a horse that is thus incessantly on the feet, will seldom carry flesh, or be safe to ride or drive. There is no cure for it, but the close tying up of the animal, except at feeding time.”

XVIII. What Is Unsoundness?

Upon this head we condense from Youatt, retainining his language, as follows: “That horse is sound in whom there is no disease, nor any alteration of structure in any part which impairs, or is likely to impair, his natural usefulness. That horse is unsound that labors under disease, or that has some alteration of structure that does interfere, or is likely to interfere, with his natural usefulness. The term *natural usefulness* must be borne in mind. One horse may possess great speed, but is soon knocked up; another will work all day, but cannot get beyond a snail’s pace; one with a heavy forehead is liable to stumble, and is continually putting to hazard the neck of his rider; another, with an irritable constitution and a washy make, loses his appetite, and begins to scour if a little extra work is exacted from him. The term unsoundness cannot be applied to either of these; it would be opening far too wide a door to disputation and endless wrangling. The buyer can discern, or ought to know, whether the form of the horse is that which will render him likely

to suit his purpose, and he should try him sufficiently to ascertain his natural strength, endurance, and manner of going. Unsoundness, we repeat, has reference only to disease, or to that alteration of structure which is connected with, or will produce disease, and lessen the usefulness of the animal."

1.—"*Broken-Knees* certainly do not constitute unsoundness after the wounds are healed, unless they interfere with the action of the joint, for the horse may have fallen from mere accident, or through the fault of the rider; but no person would buy a horse with broken knees until he had thoroughly tried him, and satisfied himself as to his form and action.

2.—"*Capped-Hocks* may be produced by lying on an unevenly-paved stable with a scanty supply of litter, or by kicking, in neither of which cases would they constitute unsoundness, though in the latter they would be an indication of vice; but in the majority of instances, they are either the consequence of sprain of the hock, and accompanied by enlargement of it, when they would be unsoundness. A special warranty should always be taken against capped-hocks.

3.—"*Contraction* is a considerable deviation from the natural form of the foot, but not necessarily constituting unsoundness; it requires, however, most careful examination on the part of the purchaser or veterinary surgeon, to ascertain that there is no heat about the quarter, or ossification of the cartilage; that the frog, although diminished in size, is not diseased; that the horse does not step short and go as if the foot were tender, and that there is not the slightest trace of lameness.

4.—"*Corns* manifestly constitute unsoundness. The portion of the foot in which they are situated will not bear the ordinary pressure of the shoe; and any accidental additional pressure from the growing down of the horn, or the introduction of dirt or gravel, will cause serious lameness.

5.—"*Cough*.—This is a disease, and consequently unsoundness. A horse, therefore, should never be purchased with a cough upon him without an especial warranty; or, if the cough not being observed, he is purchased under a general warranty, he may be returned as soon as it is discovered.

6.—"*Roaring, Wheezing, Whistling, High-blowing, and Grunting*, being the result of alteration of structure or disease in some of the air passages, and interfering with the perfect freedom of breathing, and especially when the horse is put on his speed, without doubt constitute unsoundness. There are decisions to the contrary, which are now universally admitted to be erroneous. *Broken-wind* may be regarded as still more decidedly unsoundness.

7.—“*Crib-biting*.—Although there is some difference of opinion among veterinary surgeons on this point, crib-biting must be regarded as unsoundness. This unnatural sucking in of the air must be to a certain degree injurious to digestion, must dispose to colic, and so interfere with the strength, and usefulness, and health of the horse. Some crib-biters are good goers, but they would have probably possessed more endurance had they not acquired this habit; and it is a fact well established, that as soon as a horse begins to become a crib-biter, he, in more than nine cases out of ten, begins to lose condition.

8.—“*Curb* constitutes unsoundness while it lasts, and perhaps while the swelling remains, although the inflammation may have subsided; for a



YEARLING MORGAN FILLY.

horse that has once thrown out a curb, is for a while at least, very liable to do so again on the slightest extra exertion. A horse, however, is not returnable if he should spring a curb five minutes after the purchase, for it is done in a moment, and does not necessarily indicate any previous unsoundness or weakness of the part.

9.—“*Cutting*, as rendering a horse liable to serious injury of the legs, and indicating that he is either weak, or has an awkwardness of gait inconsistent with safety, should be considered as unsoundness.

10.—“*Enlarged Glands.*—To a slight enlargement of the glands under the jaw much attention need not be paid; but if they are of considerable size, and especially if they are tender, and the gland at the root of the ear partakes of the enlargement, and the membrane of the nose is redder than it should be, we should hesitate in pronouncing that horse to be sound. We should fear the commencement, or the insidious lurking, of disease.

11.—“*Enlarged Hock.*—A horse with enlarged hock is unsound. The structure of this complicated joint being so materially affected that, although the horse may appear for a considerable time to do ordinary work well, he will occasionally fail even as to that, and a few days' hard work will always lame him.

12.—“*The Eyes.*—That inflammation of the eye of the horse which usually terminates in blindness of one or both eyes, has the peculiar character of remitting or disappearing for a time, once or twice, or thrice, before it fully runs its course. The eye, after an attack of inflammation, regains so nearly its former natural brilliancy, that a man well-acquainted with horses will not always recognize the traces of former disease. After a time, however, the inflammation returns, and the result is unavoidable. A horse from four to six years of age that has had one attack of this complaint, is long afterwards unsound, however perfect the eye may seem to be, because he carries about with him a disease that will again break out, and eventually destroy the sight. Whether, therefore, he may be returned or not, depends on the possibility of proving an attack of inflammation of the eye, prior to the purchase. (See ophthalmia, page 520.) All defects of the eye should be provided against by special guarantee. (See page 250.)

13.—“*Lameness*, from whatever cause arising, is unsoundness. However temporary it may be, or however obscure, it lessens the utility of the horse, and renders him unsound for the time. How far his soundness may be afterwards affected, must depend on the circumstances of the case. A lame horse is for the time an unsound one.

14.—“*Neurotomy.*—A question has arisen how far a horse that has undergone the operation of the division of the nerve of the leg, and has recovered from the lameness with which he was before affected and stands his work well, may be considered to be sound. In our opinion there cannot be a doubt about the matter. A horse on whom this operation has been performed may be improved, may cease to be lame, may go well for many years; but there is no certainty of his continuing to do so, and he is unsound.

15.—“*Ossification of the lateral cartilages* constitutes unsoundness, as interfering with the natural expansion of the foot, and in horses of quick work almost invariably producing lameness.

16.—“*Pumiced-foot*.—When the union between the horny and sensible lamellæ, or little plates of the foot, is weakened, and the coffin-bone is let down, and presses upon the sole, that horse must be unsound, and unsound forever, because there are no means by which we can lift up the coffin-bone again into its place.

17.—“*Quidding* is unsoundness for the time ; but the unsoundness will cease when the teeth are properly filed, or the catarrh relieved, or the cause of this imperfect chewing removed.

18.—“*Quittor* is unsoundness.

19.—“*Ring-bone*.—Although when the bony tumor is small, and on one side only, there is little or no lameness, and there are a few instances in which a horse with ring-bone has worked for many years without lameness ; yet, from the action of the foot, and the stress upon the part, the inflammation and the formation of bone have such a tendency rapidly to spread, that we must pronounce the slightest enlargement of the pasterns or around the coronet, to be a cause of unsoundness.

20.—“*Sand crack* is manifestly unsoundness ; but it may occur without the slightest warning, and no horse can be returned for one that is sprung after purchase.

21.—“*Spavin* is unsoundness, whether bony or blood-spavin. In the first, lameness is produced, at least at starting, in ninety-nine cases out of a hundred, and there is enlargement of the hock, which rapidly spreads with quick and hard work, although the horse may be capable of, and may even get better at slow work. Blood-spavin is unsoundness, because, although it may not be productive of lameness, at slow work, the rapid and powerful action of the hock in quicker motion will produce permanent, although not considerable lameness, and which can scarcely ever be with certainty removed.

22.—“*Splint*.—It depends entirely on the situation of the bony tumor on the inside of the shank-bone, whether it is to be considered as unsoundness. If it is not in the neighborhood of any joint, so as to interfere with its action, and if it does not press upon any ligament or tendon, it can be no cause of unsoundness.

23.—“*Thickening of the Back Sinews*, if pronounced, and occasioned with thickening of the leg, is unsoundness.

24.—“*Thoroughpin*, when of great size, and *thrush*, when pronounced, should undoubtedly be regarded as unsoundness, and is so regarded by good authorities.”

In fact, in many disabilities, the most discriminating judgment should be used. Since a disability that would detract but little from a horse for one use, might render him comparatively worthless for another.

BOOK I

PART II

Diseases of the Horse

HOW TO KNOW THEM; THEIR CAUSES, PRE-
VENTION AND CURE



PERFECTION.—FRENCH COACH STALLION.

DISEASES OF THE HORSE.

CHAPTER I.

SYMPTOMS AND GENERAL TREATMENT.

- I. INTRODUCTION.—II. OUTWARD MANIFESTATIONS OF DISEASE.—III. SYMPTOMS OF INTERNAL DISEASES.—IV. IMPORTANCE OF PROMPT TREATMENT.—V. KNOW WHAT YOU ARE TREATING.—VI. NURSING AND FEEDING SICK ANIMALS.—VII. EXPLANATION OF TERMS USED.—VIII. GRADUATION OF DOSES.—IX. HOW OFTEN TO GIVE MEDICINES.—X. FORMS OF MEDICINES AND HOW TO ADMINISTER.

I. Introduction.

The horse, especially when subject to artificial care and conditions, and more especially in cities and large stables, is liable to pretty much the same diseases, or, at least, to diseases similar in their nature to those of man. Besides various epidemics, such as lung diseases, colds and influenza,—diseases arising from injuries, and bad care, involving diseases of the skin and its integuments, and of the ligaments, muscles and bones, are quite common in horses. Such diseases are comparatively rare in the human family, for the reason that horses are often put to terrible strain in running, leaping, drawing heavy loads in the mud, and on rough pavements, etc. These, from the want of proper knowledge, or from neglect, assume the most serious forms, and often totally unfit the horse for active labor, if they do not entirely ruin him.

The importance of common-sense treatment and training has been fully elucidated in the preceding pages. The importance of proper care, sufficient clothing, grooming, good ventilation, and kindness in their general treatment has also been insisted on. If the information to be given in the succeeding pages, relating to proper care in sickness, is observed, much trouble and loss will be saved to the farmer, who is often necessarily precluded from calling in the services of a competent veterinary surgeon, because, in many country districts, there are none.

The object of this work, therefore, is to give, in plain language, the necessary treatment of such diseases as may be cared for, by other than the professional surgeon; and to give such advice as will prevent the occurrence of many disabilities, which, if taken out of the list, by their prevention, would very much lighten the task of the veterinarian. These should be well known and carefully studied by every horse owner, for thus might often be prevented spavin; curb; splint; ringbone; caries,

in its various forms; swellings of the muscular integuments, causing serious trouble; injuries to the sinews, causing breaking down; poll evil and other fistulous affections; fractures; founder; grease; inflammations of the glands and veins; cracked hoofs; quittor; hernia and many other diseases, not recognized by the horse owner, as a rule, until they have become serious.

A careful attention to symptoms which will be given in plain language, and the application of appropriate remedies, will save the owner money, and at the same time will also save the most intelligent servant, and if allowed to be, the faithful friend of man, much terrible torture. The feet and limbs are most liable to disease. Those who have suffered from the torture of a tight boot, can only form a partial idea of the agony of a horse suffering from disease of the feet, and especially from navicular disease, attacking, as it does, the most delicate organs, encased in the horny covering of the foot. The *causes* of disease, therefore, *how to know it* by outward symptoms—for the horse cannot tell his distress, except by mute signs, and *what to do*, will be told in the following pages. In cases where danger is present from contagious and utterly incurable diseases, as glanders, or incurable infectious diseases as hydrophobia, the animal should be quickly and mercifully killed, and buried deep out of the way of danger.

II. Outward Manifestations of Disease.

To make plain what would otherwise not be readily comprehended, the diseases will be illustrated by cuts. These cuts will often present the disease in its strongest forms, whereby the same difficulties will be the more easily recognized in their lighter manifestations. Many of the diseases of the skin, and especially of the bones, may go on for a long time without the cause being surely known. Hence the illustration of some internal diseases, as shown outwardly, will be very instructive. The most of them are caused by neglect or abuse. Their treatment will be given in their proper places, as, for instance, those of the feet, in the next chapter. The condensed description of their origin, with references to the illustration on the next page, will enable them to be readily recognized.

1—*Discharge from nose*, either mucus or pus, or both. This may occur not only in glanders, but also in acute and chronic catarrh.

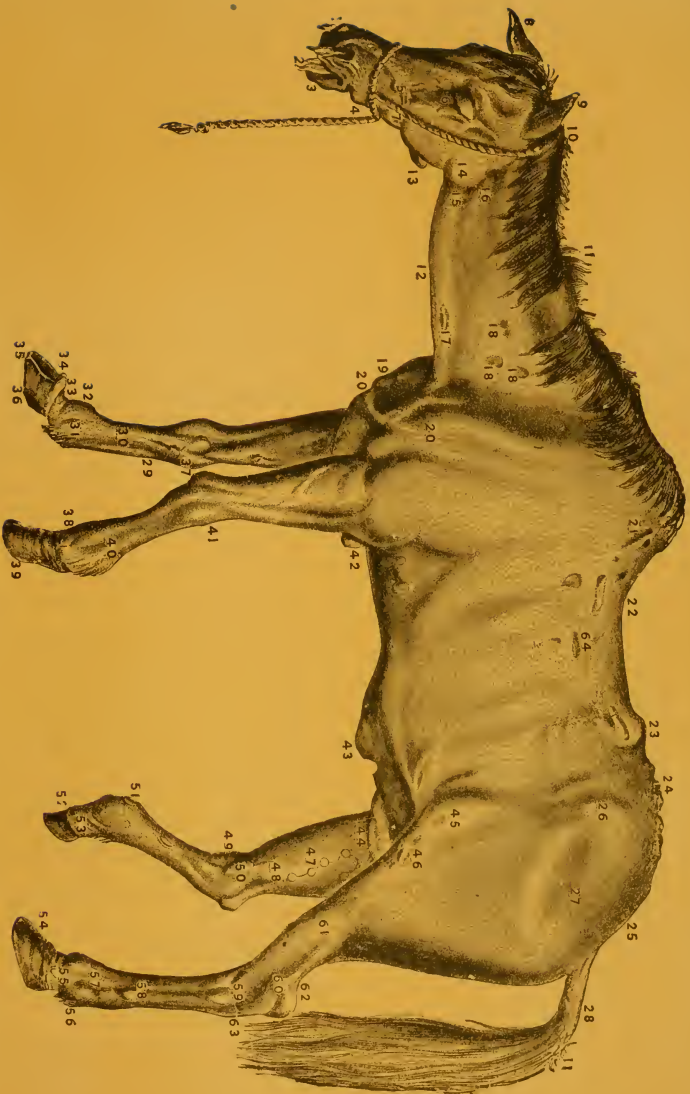
2—*Profuse flow of saliva*, resulting from a severe wound or swelling of the tongue, the mouth being partly open.

3—*Loose, flabby lip*, an evidence of partial paralysis of the part.

4—*Fistula of the lower jaw*, from an ulcerated tooth. This sometimes involves a large part of the lower jaw.

5—*Fistula of the upper jaw*, from same cause.

6—*Blind eye*. Frequently, accompanying a blind eye there is a continuous flow of tears over the cheek.



THE EXTERNAL DISEASES OF THE HORSE WITH VARIOUS DEFECTS AND BLEMISHES.
Specially designed and drawn for this work.

7—*Salivary fistula*; a fistulous opening into the duct that conveys the saliva from the parotid gland to the mouth.

8—*Large, long, drooping ear*. Some horses have ears so large that they droop from their own weight.

9—*Small short ear*, sometimes called "Hare Ear."

10—*Poll evil*; a running sore on the back of the neck, originating in a boil, or from striking the poll a hard blow, as on a low ceiling, etc.

11—*Itch or Mange*; itchy skin diseases, causing the animal to rub himself, oftentimes till the hair and mane are all rubbed off.

12—*Ewe neck*; the neck appears to be put on wrong side up; instead of curving upward and forming a handsome crest, it curves downward.

13—*Bony tumor*, caused by a blow on the jaw bone, from striking against the manger or other hard body.

14—*Goitre*; the common name for an enlarged thyroid gland.

15—*Enlarged jugular vein*, following bleeding, when badly done.

16—*Swelling of parotid gland*, from a bruise or undue compression.

17—*Fistula from improper bleeding*; the wound fails to heal.

18—*Farcy buds* on the neck.

19—*Abscess on breast*, from a bruise from a collar, or other contusion.

20—*Swelling of the lymphatic glands* of the breast.

21—*Fistulous withers*; a chronic discharge following the formation of an abscess, caused by a bruise.

22—*Sway back*; a back unusually hollow.

23—*Saddle gall*, forming a sitfast when chronic.

24—*Eel back*; a rough uneven outline over the croup.

25—*Drooping rump*—an extreme case.

26—*Coarse, pointed hip*, one liable to be knocked down.

27—*Atrophy of the muscles*, from disease or a bruise, or else from long standing lameness, allowing wasting to take place from disuse.

28—*Rat-tail*; hair off from disease of the skin of the tail. If it drops out badly once, it seldom returns.

29—*Thickened tendons* (involving also their sheaths), at the back of the leg, from sprains, and causing severe lameness.

30—*Splint*; a bony tumor, the ossification of an effusion thrown out between the cannon and splint bones.

31—*Gall on fetlock joint*, from interfering.

32—*Enlarged fetlock joint*, from neglected or ill-treated sprain, etc.

33—*Malformed pastern*, which is too long and low; from this faulty conformation, the fetlock is liable to come too low, inducing sprains.

34—*Ridge in the hoof*. Any ridge or wrinkle in the hoof indicates the existence of fever in the coronet at some previous time.

35—*Ox foot*; a foot resembling that of an ox, either as a natural

peculiar conformation or from disease of the coffin joint, causing a bulging of the hoof in the front part of the foot.

36—*Quarter crack*; a split in the fibers of the hoof from faulty nutrition of the part, allowing it to become brittle.

37—*Indurated enlargement of the knees*, from sprains or bruises.

38—*Stilt foot*, from disease of the foot around the heels or quarters.

39—*Contracted hoof*, either from disease or disuse.

40—*Mud fever* (Erythema); inflammation in the skin from exposure to ice water and mud. There is swelling of the leg, scabby condition of the skin, and the hair falls out.

41—*Mallenders*; inflammation of the skin in the flexure of the knee; the skin becomes dry and hard, with transverse fissures, and the knee is chronically enlarged.

42—*Shoe boil*; a tumor caused by lying on the shoe.

43—*Navel rupture*; the intestines protrude through the unclosed navel opening, being held in only by the skin.

44—*Inguinal hernia*; the intestines pass down through the abdominal rings and inguinal canal, and, in stallions, into the scrotum.

45—*Flank (or ventral) hernia*; the abdominal wall having been ruptured, the bowels protrude through it, being retained only by the skin.

46—*Stifle lameness*, from a sprain, kick, puncture or other wound. If dislocation of the patella occurs, the horse is said to be stifled.

47—*Farcy buds*; enlarged (sometimes ulcerated) lymphatic glands.

48—*Bog spavin*; distension of the synovial bursa, with lameness.

49—*Sallenders*; a skin disease in the flexure of the hock joint; the same disease in the flexure of the knee is called mallenders.

50—*Bone Spavin*; a disease affecting the bones of the hock joint, and generally accompanied by a bony tumor on some part of the joint.

51—*Bursal enlargement* of fetlock, in front; a soft, puffy swelling.

52—*Hoof with rings*, indicating previous fever, usually laminitis.

53—*Sand crack*; same as quarter crack, but comes in front.

54—*Flat foot*. The bones and hoof are flat and large, being the opposite of the straight, upright foot.

55—*Quittor*; a running sore or fistula of the quarter, the opening being above the coronet, and the sinus running downward, inside the hoof.

56—*Grease heel*; a deep-seated skin disease, with an offensive discharge; due to humor in the blood, and aggravated by filth and neglect.

57—*Big leg*, from neglected disease of the limb.

58—*Wind galls*; soft, puffy swellings that appear to be filled with air, but, really, with synovia or joint oil.

59—*Blood spavin*; a distension of the vein at the hock from pressure upon it by a bony tumor.

60—*Throughpin*; a puffy enlargement at the upper and back part of the hock joint, usually appearing both on the inside and outside.

61—*Weak, small thigh*, from faulty development.

62—*Capped hock*, an enlargement on the point of the hock, usually filled with serum; caused by a bruise, oftenest by kicking in the stall.

63—*Curb*; an enlargement of the back of the hock, from sprain.

64—*Saddle gall*, from uneven pressure of the saddle.

III. Symptoms of Internal Diseases.

Internal diseases cannot be illustrated except to depict the actions of the animal when suffering with derangement of the internal organs or their connections. Their actions, such as position, standing, lying, rolling, kicking, jumping, running etc.; inclinations, such as the appetite, either ravenous or lost; thirst, either excessive or none, etc., are all condensed into one word, Symptoms. They express the feelings and appearances of the animal, and these, along with a few scientific observations, are all we have to rely upon to diagnose (recognise) the disease. Hence, it is of vital importance to be cognizant of the actions, habits, constitutional condition as to pulse, respiration, digestion; color and quantity of the excretions; nature, quality and quantity of food required; characteristics of age, length of time *in utero*, development and longevity; in fact all the characteristics of health, in order to be able to know when an animal is sick. The sooner sickness is recognized and given the proper treatment, the sooner health will be restored and the less will be the liability of death and loss; and from a humane point of view, the less the animal will suffer from extensive lesions.

IV. Importance of Prompt Treatment.

A stitch in time saves nine. There is nothing in which this true saying applies more forcibly than in the treatment of ailments of all kinds, either external or internal. For instance, a horse goes lame from a corn; if attended to properly it is cured in a week; if neglected it festers, spreads, works up through the foot and breaks out at the top of the hoof, forming a quittor, which takes from one to three months to cure, the animal necessarily being idle nearly all the time. Or the horse catches cold, has catarrh, running from the nose and eyes, sore throat, cough and loss of appetite; and if promptly and properly treated he may be cured in from two to ten days. But if neglected for a day or two, to see if he will get well without any bother or expense, the disease is almost sure to run down onto the lungs and cause a sickness very painful, of long duration, considerable expense and possible fatal termination.

V. Know What You are Treating.

Therefore we would urge as a matter of very great importance that the course adopted in case of sickness or lameness be applied promptly and

thoroughly, yet with sufficient caution to be convinced that you are on the right track, so as not to be treating an ankle because it is cocked when every particle of the lameness is in the foot, or dosing a horse for bots when the trouble is pleurisy, or giving a dog medicine for inflammation of the brain when he is suffering from rabies.

These and many other similar mistakes have come under the observation of the writer. One notable case, in which many might have been deceived, was seen not very long ago; a horse was blistered from one knee up the leg, over the shoulders and withers and down on the other side to the knee for sprain and soreness in the shoulders, when every bit of the disease lay in the feet. It was a case of acute founder. We relate this to impress upon the reader the necessity of careful, deliberate study of a case before taking action; but when the derangement is conclusively located go ahead and apply promptly the remedies prescribed.

VI. Nursing and Feeding Sick Animals.

Much ingenuity can be displayed in nursing a sick animal. In order to do it intelligently the nurse must be familiar with the habits and requirements of the animal in health. A few simple rules will assist the amateur. Make the animal as comfortable as possible, warm in winter and cool in summer. Give plenty of fresh air to breathe, but in all cases avoid a draft; ventilation without drafts is the rule. Clothing for horses is often necessary, woolen blankets in winter and linen sheets and nets in summer. Hoods to cover the head and neck are often needed if the stable is not sufficiently warm. The proper temperature for the stable that is used for the hospital is from 55° to 60° F. This is warm enough for all animals except very weak lambs and sick dogs; they require a warmer room, from 62° to 70° F. A part of the dwelling house is the best for them, if they are not too numerous.

See that the place is dry and the drainage good. An elevated location is better than a low-lying one.

The food wants to be simple, clean, nutritious, easy of digestion by being cooked, changed occasionally and administered often and in small quantities. Give green food, always, when it can be got. Oats, corn, barley, bran, shorts, etc., may be scalded with boiling water, covered and left to steam till cold, and then given. It is a great advantage to have the grain ground. Hay and water should always be given in liberal quantities; and see that they are clean and pure. Warm milk for calves, and the same diluted and sweetened a little for lambs and foals; beef tea, raw eggs, porridge of either oat or corn meal and milk for dogs, and the same for pigs will be found to be the best diet. In feeding sick animals give a little, often, but be careful not to over-feed, as that is liable

to throw the patient back and increase fever. Horses, cattle, etc., need to be fed three or four times a day; foals, calves, lambs, dogs, etc., every two to four hours.

Fever patients should have pure water near, so they can help themselves when they wish it. Those suffering from diarrhoea or excessive purgation should be watered four or five times a day, but in smaller quantities.

Rest should always be given to sick animals; many cases prove fatal from working too long after being taken sick, or from being put to work too soon after recovery.

VII. Explanation of Terms Used.

To some readers a few words of explanation may be necessary in order to the proper understanding of the drugs and their doses.

Alteratives change the conditions and functions of organs.

Anæsthetics deprive of sensation and suffering.

Anodynes allay or diminish pain.

Antacids are antidotes to acids.

Anthelmintics kill or expel worms.

Antiperiodics arrest or retard the return of a paroxysm in periodic diseases.

Antiseptics prevent, arrest or retard putrefaction.

Antispasmodics prevent or allay cramps.

Aperients gently open the bowels.

Aromatics, strong-smelling stimulants, dispel wind and allay pain.

Astringents cause contraction of vital structures.

Carminatives, warming stimulants (Aromatics).

Cathartics, *Purgatives*, freely open the bowels.

Cholagogues increase the secretion of bile.

Demulcents sheathe and protect irritated surfaces.

Diaphoretics, *Sudorifics*, cause perspiration.

Discutients dispel enlargements.

Disinfectants destroy infecting matter.

Diuretics increase the secretion of urine.

Ecbolics, *Parturients*, cause contraction of the womb.

Emetics induce vomiting.

Expectorants increase the secretion from the air tubes.

Febrifuges counteract fever—lower temperature.

Laxatives (Aperients).

Narcotics allay pain and produce sleep.

Refrigerants diminish heat.

Sedatives depress nervous power or lower circulation.

Soporifics induce sleep.

Stimulants temporarily excite the nervous or circulatory system.

Sialogogues increase the secretion of saliva.

Stomachics improve digestion.

Tonics gradually and permanently improve digestion and nutrition.

Vermifuges kill and expel worms.

VII. Graduation of Doses.

The relation of quantity of medicine to the age of the patient is thus given by Prof. Low: The doses given may be held applicable to full grown animals of medium size, therefore some allowance must be made in any case in which the patient exceeds or comes short of the average of his kind. A similar modification must be made as regards young animals, not only on account of their smaller size but also of their greater susceptibility. The following table may serve as a guide:

HORSE, ETC.	OX.	SHEEP.	SWINE.	DOGS.	DOSE.
3 years.	2 years.	1½ years.	15 m'ths.	½ year.	1 part.
1¼-3 "	1-2 "	9-18 m'ths.	8-15 "	3-6 moths.	½ —
9-18 m'ths.	6-12 m'ths.	5-9 "	6-8 "	1½-3 "	¼ —
5-9 "	3-6 "	3-5 "	3-6 "	3-45 days.	⅛ —
1-5 "	1-3 "	1-3 "	1-3 "	10-20 "	1/16 —

Allowance must also be made for a nervous temperament which usually renders an animal more impressible, for habit or continued use which tends to decrease the susceptibility for individual drugs, for idiosyncrasy which can only be discovered by observing the action of the agent on the particular subject, and for the influence of disease when that is likely to affect the action. Thus in most diseases of the brain and spinal cord, and in some impactions of the stomach, double the usual quantities of purgative medicine will be necessary, while in influenza and other low fevers half the usual doses may prove fatal. In acute congestion of the brain, stimulating narcotics (opium, belladonna, hyoseyamus,) would aggravate the symptoms, etc.

IX. How Often to Give Medicines.

Febrifuges, or doses intended to reduce fever, such as aconite, belladonna, spirits of nitre, solution of the nitrate or chlorate of potash, or any form of ammonia should be repeated as often as every two hours in bad cases, and from that to three or four times a day in mild cases. Alteratives may be repeated once or twice a day. Purgatives may be repeated after twenty to thirty hours in bad cases, and after forty to forty-eight hours in mild cases. Tonics should be repeated once, twice or thrice a day. Stimulants, especially alcoholic, may be repeated after two to six hours. Ecboics may be repeated after half an hour; anodynes after half an hour; other remedies as required.

X. Forms of Medicines and how to Administer.

Medicines should always be given in the food or drink, when possible, to avoid worrying the patient and also to avoid the danger of choking from the liquid running into the lungs. When the medicine is nearly inodorous and tasteless it can be mixed with bran mashes, or other soft feed. Aloes should be made into a roll the size and shape of your finger and wrapped in thin paper or put into a gelatine capsule, and passed back onto the root of the tongue of the horse.

Liquid medicine, in large doses, is given as drenches out of a strong-necked bottle or horn, the head being elevated and the neck of the bottle inserted at the side of the mouth and poured very slowly in, the head being kept raised till all is swallowed. If the patient coughs while being drenched, let the head down instantly, regardless of the loss of the medicine, for, if kept up, it is apt to run into the lungs, and cause death in two minutes.



MANNER OF GIVING A DRENCH TO
A HORSE.

Small doses are best given with a syringe; open the mouth with the left hand and insert the syringe in the left side of the mouth, and shoot the contents well back into the throat. A syringe or spoon may be used on all small animals.

Medicine for cattle and sheep needs to be more bulky and watery, on account of the great size, comparatively, of the stomach, and when not practicable to administer it in the food, it should be dissolved in from one to two quarts of water for cattle, and one to two pints for sheep, and given as a drench from a bottle or horn.

Care should be taken to avoid letting the animal bite the bottle; keep the neck of it firmly up against the roof of the mouth between the two rows of upper teeth. If the animal should break the bottle, let the head down instantly and remove the broken glass as quickly as possible.



A GOOD FARM CHUNK.

This horse has a little too much length of body and not enough depth. Height, 15-3 hands; weight, 1350 pounds. Horses of this type may be found on the market at all seasons of the year, but during the spring months they form an important feature of the trade. They are adapted to use on the farm and are in most urgent need during the season when crops are being planted. They are usually mixed breeding, draft blood predominating, commonly known among farmers as "all purpose horses."

For this class low down blocky horses are wanted, not so heavy as the Eastern Chunks. Farm Chunks are usually lighter of bone and often slightly blemished or unsound. Since farmers do not usually care to pay for high priced horses they are often compelled to accept those with slight injuries, such as small side bones, curbs, wire marks, etc. In general, the typical Farm Chunk should be a moderately sized, all around good individual standing from 15 to 15-3 hands high and weighing from 1200 to 1400 pounds. The sample here given is well representative of the class.

CHAPTER II.

FEET OF THE HORSE AND THEIR DISEASES.

- I. CORNS.—II. QUITTOR.—III. QUARTER AND SAND CRACKS.—IV. SEEDY TOE.
—V. PRICKING FROM NAILS—VI. ACUTE FOUNDER OR LAMINITIS.—VII.
CHRONIC FOUNDER OR LAMINITIS.—VIII. PUMICED FEET.

I. Corns.

There is no ailment so common to horses' feet as corns. Fully nine-tenths of the lameness in the feet are from this source.

Causes.—They are the result of uneven pressure of the shoe, too much bearing on the quarters, especially the inner one, and too heavy bearing on the heels. This results from the shoes being left on too long without being reset, and the feet pared down and the heels opened to remove the surplus growth of hoof, that would be worn off if the foot were not shod. Corns are often caused by contraction of the feet, the pressure on the walls of the quarters, by the contraction of the hoof, being very great.

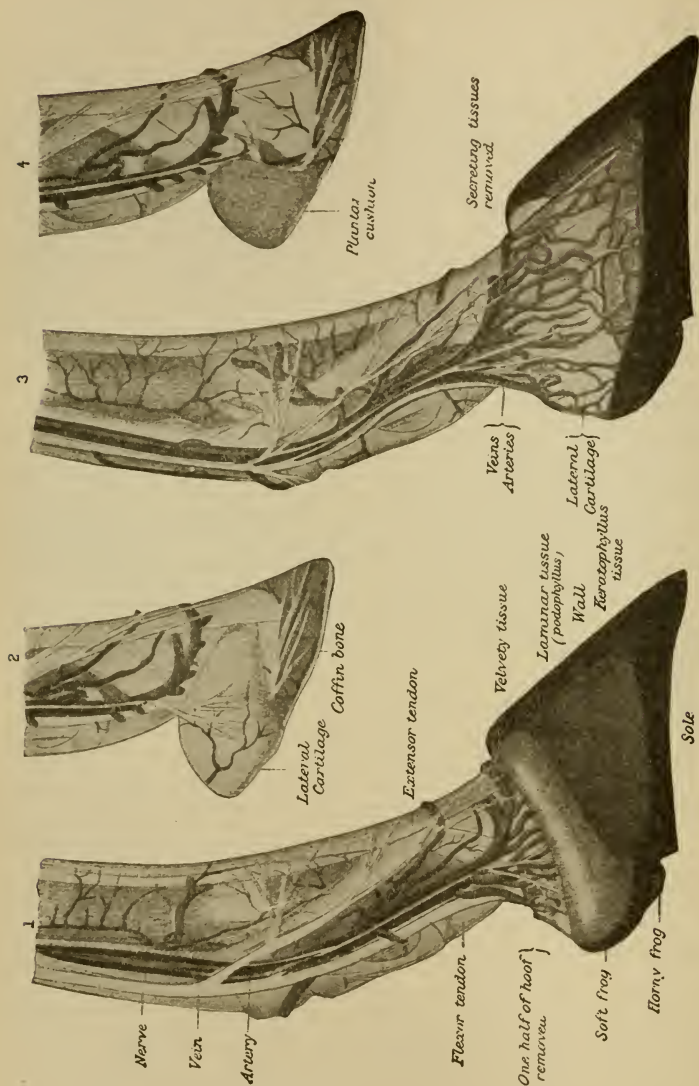


SOLE OF A
FOOT.

Showing a
small scarlet
spot, indica-
ting a new
corn.

It is necessary, as a rule, to shoe horses' feet, and in order to keep them healthy the shoes should be reset about once a month, the sole and wall reduced to their proper size, heels opened, and the ragged surface, if any, trimmed off the frog. The effect of the too heavy bearing on the quarters and heels is to bruise the soft parts underneath, giving rise to soreness, and after a day or two a reddish or purple spot will appear, varying in size from a ten cent piece to that of a quarter of a dollar. If the bruising is light, the corn may become caloused and remain a constant source of lameness, but not very severe, for a long time; but, if it is bad, the corn soon festers, matter forms and increases, spreading in all directions, till it gets vent either by being opened at the bottom, or breaks out at the top at the junction of the hoof and hair, forming a quittor.

How to know it.—Lameness appears, slight at first, but increasing very fast from day to day. The horse will show an inclination to favor the sore quarter, and will not wear the shoe quite so much on that heel. By applying the hand to the foot, you will notice heat in the sore part.



ANATOMY OF FOOT.

Tapping the foot gently with a hammer will make the horse flinch when the sore spot is reached, and he will point the foot (thrust it out forward) resting it on the toe, raising the heels completely off the ground. If there are corns on both feet, he will change feet, will point first one, then the other. If the corns are small and not very sore, the lameness may diminish with travel, so that when well warmed up he will go quite sound, till he stands at rest again. Then he will go off lamer than ever. When the corn is festered, he will be very lame, indeed, will only touch the toe to the ground, will move with the greatest difficulty and reluctance. When the shoe is removed, you will find the purple spot in the quarter, between the wall and the bar, near the heel.



SOLE OF A FOOT.

Showing the usual position of a corn.

What to do.—Remove the shoe, pare out the quarter well, so as to remove all pressure, and let out any matter that may be under the sole; then put the foot into a linseed poultice made up soft with hot water. Leave it on twenty-four hours, then renew it. While the poultice is off, examine the foot to see if it needs any more paring; if the hole is deep, you will need to cut the hoof well away to allow the matter to escape freely; for if you do not, it will work up through to the top of the hoof.

Before putting the poultice on again, pour into the corn a little pure carbolic acid, or turpentine, or dilute nitric acid—diluted one-half with water. Dress it in this way once a day till all soreness is gone, and the horse will stand on the foot as well as ever. Then leave off the poultice.

If proud flesh comes up in the hole, burn it down with powdered blue vitriol. The hoof you have pared away will soon grow again. When it has stopped running, apply the vitriol once a day, which will dry and heal it. When it is all dry, and the horse walks sound on the foot, put on a bar shoe to protect the weak quarter, giving the frog gentle pressure; pour warm tar into the hole, and stuff oakum or tow soaked in tar under the shoe. When shoeing afterwards, bear in mind to avoid too heavy bearing on the heels. When that quarter has grown out again, and is strong, the bar shoe may be replaced by an open one.

If the foot is much contracted, take the bearing off the quarters by reducing the walls a little, so as to have the appearance of the shoe having been sprung off the heels, but let the shoe be perfectly level. Open the heels well up towards the hair, so as to give the feet a chance to spread while growing.

When a foot is much inclined to have corns, the shoe should be reset often—every two or three weeks—and the quarters well cleaned out each time.

Extra care will have to be taken of the feet that have once been affected with corns, to keep them soft. Soak them in a tub of either cold or

warm water. Some add salt, soda, etc., but it is better clear, as the only virtue lies in the moisture. Many of the substances used are injurious to the hoofs, by making them brittle. Or pack the hoof with linseed meal, or oil-cake meal, wet up with hot water. If there is much heat and fever, put on swabs, either made of felt or pieces of old blanket or woolen cloth, folded and tied around the pastern, and left to hang down over the feet, and wet frequently with hot water.

A horse that has chronic corns can be cured by shoeing him with tips reaching half way back to the heels, letting the heels come to the ground and take wear. This gives frog pressure also and spreads the quarters, which will in time grow the corns completely out. A little fly blister rubbed into the coronets of the fore feet will stimulate a healthy growth of horn, and assist in overcoming the conditions of the hoof that helped to induce the corns.

II. Quittor.

Quittor is the name given to a disease of the foot, when the festering of any other sore works up through, and breaks out at the top of the hoof at the junction with the hair.

Causes.—It is usually the result of a neglected corn, prick of a nail, gravel getting into a nail hole, or a festered corn working up through to the top of the hoof.

How to Know it.—It usually occurs on the quarters, anywhere from the heels to two or three inches forward, but is oftener seen on the inner quarter, because corns are most often found there. It makes its appearance, after the horse has been lame for some time, by swelling at the coronet. Sometimes the first active swelling of the part is as large as a hen's egg. In the course of a day or two it breaks and discharges matter, when the horse will be relieved of some of the pain, which has been very intense during the formation of the sore. Sometimes the foot can scarcely be put to the floor at all, and may be kept paving most of the time. After the quittor has been running two or three days, the flesh around the opening will turn purple and



A QUITTOR.
In active suppuration,
before the pus has
broken out at the top.



A QUITTOR.
After it has broken
out at the top.

get soft, and the matter will spread, extending each way, but more towards the front. In a couple of weeks pipes will have formed, pointing downwards in all directions, having one common center in the opening at the top. If let alone, the walls of the pipes will thicken and harden, and the enlargement at the top will increase, sometimes to the size of a man's fist. All this time the lameness continues very great, and, if allowed to run on for three months or more, the foot becomes so full of pipes and so large, hot and painful as to require

very persistent and thorough treatment to stop the disease, and can never be reduced to its natural size and form. In extreme cases lameness is permanent, with a tendency of the toe to turn up, and the horse walks on his heel.

What to do.—If taken as soon as it breaks open at the top, poultice the foot for twenty-four hours, to soften all the parts. Then give the diseased part vent at the bottom, to allow the matter, if any, to run out there if it will; but if none is found at the bottom, do not cut the hoof to make it bleed, as that would only make another sore, and would do no good. Open it freely at the top; probe it with a piece of smooth, rounded whalebone to find how deep the hole goes, and in what direction. Then follow the probe down with the knife, and open right out and down the hoof, as far as the hole goes, taking out a V-shaped piece of the wall to allow the matter to escape at the bottom, instead of making it come out at the top. Scarify the purple flesh to set up a healthy inflammation in the part. Then sponge it out with warm water to cleanse it, and follow with a lotion made as follows:

- | | |
|--------|--|
| No. 1. | 2 Drachms sulphate of copper,
½ Pint water.
Mix. |
|--------|--|

Inject it well down into the wound, twice a day. If it burns and causes a scab to come on the flesh, dilute it a little after using it three or four days. If after a week or ten days the wound does not appear to be getting well, change to the following:

- | | |
|--------|--|
| No. 2. | 3 Drachms sulphate of zinc,
½ Pint water.
Mix. |
|--------|--|

By being careful that the opening is down to the bottom all the time, to let the matter out, you will have no trouble in curing it. Keep the shoe off till the foot is well enough to work; then put on a bar shoe so as to protect the weak quarter.

In very bad cases, in which there are several pipes running in as many directions, it is absolutely necessary to open up each one fearlessly. Then go on with the lotions given above, and change occasionally to the following:

- | | |
|--------|--|
| No. 3. | 1 Drachm corrosive sublimate,
½ Pint water.
Mix. |
|--------|--|

In long continued treatment it is advisable to alternate the lotions, one week on, and one off.

The hoof will grow faster on account of the inflammation in it, so that it will be necessary to have the foot pared down occasionally. When the discharge is all dried up and the disease cured, blister the enlargement to reduce it. After the blister has taken hold, grease the part once a day, till it is nearly well, then repeat the blister. Soak the foot often, and pack it with oil-cake meal to keep it soft.

III. Quarter and Sand Cracks.

These are cracks in the hoof, usually lengthwise of the fibres of the hoof, though sometimes the hoof breaks across the fibres for a distance of an inch or so. But the crack rarely extends through the hoof into the laminae, or quick, consequently it does not cause lameness.



QUARTER
CRACK.

Quarter cracks come on the quarters, usually on the inside, on account of that quarter being thinner and weaker than the outer one.

Sand cracks come on the wall of the foot, anywhere forward of the quarters, and are so called on account of their being more common in sandy parts of the country.

These cracks are due to a brittle condition of the hoof, and a want of elasticity in the fibres.

Causes.—Poor assimilation, or faulty distribution of the food and a want of proper nutrition to the hoof, are principal causes giving rise to a slow growth. What does grow is hard, brittle and inelastic. Sometimes the hoofs become cracked from the heating, drying influences of sandy roads, stony pavements in cities, and long continued want of moisture to the feet. When the feet are in this condition, any severe work or pounding of the hoofs is liable to break them. Racers and trotters are particularly subject to them, because the tracks are sometimes very hard, and the tremendous exertions of the horses, and the pounding of the feet on the track, are peculiarly trying to the hoofs; and unless they are in first-class condition, they are apt to crack.

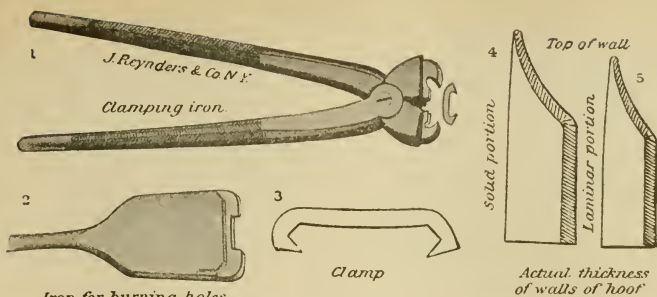


FALSE QUARTER

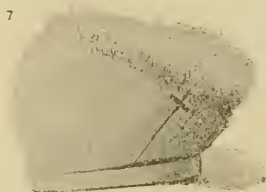
Or deficiency of the
outer wall.

How to know it.—A crack or split in the hoof, it may be only at the top or at the bottom, and very short, or in the centre, from top to bottom; or it may extend clear from the top to the bottom. It may extend inward but a little way, or it may be deep, clear into the quick, so that the soft parts are pinched between the edges of the crack, making it bleed and causing great lameness. The lameness may come on gradually or suddenly. It depends upon whether the crack starts on the surface and increases in depth with every strain, or whether it breaks right through to the quick at once. In the latter case, the horse will go dead lame immediately, and oftentimes the blood will run from the crack. But in the former case he will not be lame till the crack does extend through to the quick.

As in all cases of lameness in the foot, where there is pain, he will point the foot, that is, thrust it forward, to rest it.



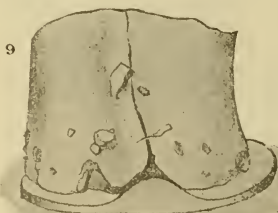
The clamp and nail remedies applied.



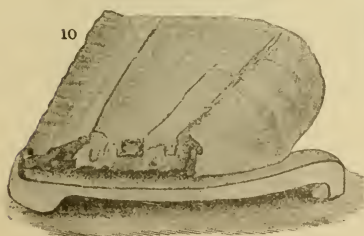
Quarter-crack with cross cut.



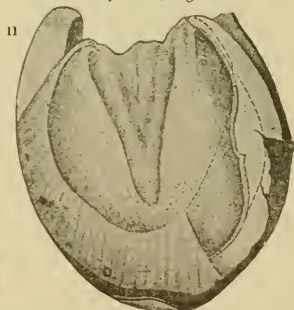
Toe crack. Wall removed to show absorption of coffin bone



Treated by clamping with nails



Cracked walls.

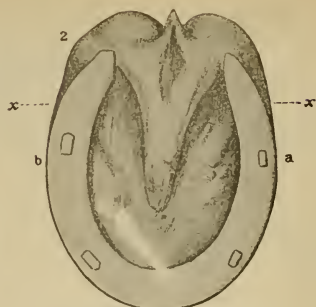


One effect of Quarter-Crack

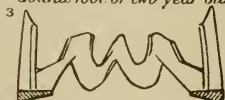
QUARTER-CRACK AND REMEDIES



*a, Nail properly driven
b, Nail improperly driven*



Sound foot of two year old.



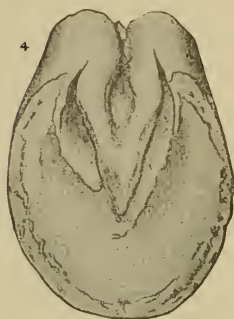
4a Section across fig. 2, at x.



Section across fig. 6 at x.



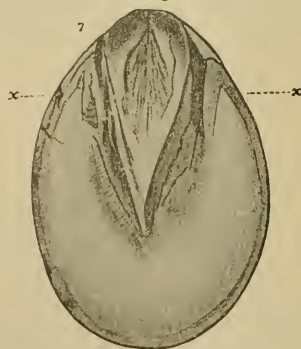
Section across fig. 7 at x.



Contracted foot.



Sound but flat foot.



Badly contracted foot.

SOUND AND CONTRACTED FEET.

What to do.—Remove the shoe and reduce the wall of that quarter, to take off the bearing. If it is broken through into the quick, take a sharp shoeing knife and pare down the edges of the crack the whole length, enough to relieve the pinching, and for a distance of half an inch on each side of the crack, to make it more pliable. Then take either a sharp knife or a red hot iron, with an edge to it, and cut or burn across the crack at the top, right through to the quick. Make the cut at least an inch long; this is to start a new hoof and make it grow down sound and naturally.

If the crack does not extend clear through the hoof, it is not necessary to pare away the edges. If there is no lameness, you may be certain it is not broken through into the quick, for if it is the horse will go lame. It is a good plan to cut or burn across the crack at the top, and take off the bearing at the bottom, but do not cut or burn so deep as in the more severe case. Then have a plate either of brass, copper or iron, half an inch wide, and an inch and a half long, screwed on across the crack; have the screws about a quarter of an inch long, and screw them into the hoof, while an assistant draws the edges of the crack together with a pair of pinchers, the horse at the time standing on the other foot to take the weight off the one operated on.

As the foot grows, the plate will have to be moved down, about once a month or six weeks, or, perhaps, not oftener than once in two months, according as the hoof grows fast or slow.

If flesh grows up between the edges of the crack, burn it down with powdered blue vitriol, applied once a day. When it is dry, and the soft parts are healed by the vitriol, dress it with pine tar once a day.

In all cases blister the coronet at the junction of hoof and hair, clear around from heel to heel, but do not blister back of the heels, in the hollow of the pastern. Let the blister be of cantharides (Spanish flies.)

If the cracks are bad, it is best to shoe with a bar shoe, which should be reset every three or four weeks.

Cracks that break crosswise of the hoof seldom amount to disability. If there is any flesh exposed, dress it with



QUARTER CRACK

Cut across the top, the bearing taken off at the bottom, and siod.



QUARTER CRACK.

Showing the hoof broken only part way up; dressed, pared and shod.



CLOSING A HOOF CRACK.

By the use of thin wire.

powdered blue vitriol once a day, till it is dry, then with tar. No change will be made in the shoeing.



FALSE QUARTER.

Relieved of bearing on the shoe.



SAND CRACK.

Pared away at the sides and bottom, to remove bearing also method of shoeing with clips to support sides of crack.



SAND CRACK.

Dressed, shod and bandaged for work, when rest cannot be given.

IV. Seedy Toe.

Seedy toe is a dry, mealy condition of the wall at the toe.

Causes.—It is caused usually by bruising of the toe, by the clip of the shoe being pounded into the toe too tightly; and the bruised part takes on a sort of dry rot, or gangrene, which extends up between the wall and the laminae. It causes tenderness of the foot when bad, but is rarely met with. It is a separation of the two layers of horn which compose the crust of the hoof, resulting from disease due to bruises or faulty condition of the body.



SEEDY TOE.

Showing the separation of the wall from the soft parts underneath.

How to know it.—When the shoe is removed, a mealy, whitish-looking substance will be seen immediately under the wall, at the toe, running up towards the hair, sometimes for an inch or so, and may be picked or broken down easily with a nail, leaving a hollow beneath the shell.

What to do.—Pare away the wall at the toe after taking off the shoe, so as to remove the bearing therefrom. Pick out all the mealy substance that breaks down easily, and turn in warm tar, and press in a little wad of tow. Replace the shoe, and apply a mild blister of cantharides to the coronet.

Prevention.—Avoid pounding the clip of the shoe into the toe, but cut away a little of the wall to form a hollow place for it.



DIAGRAM OF SHOE.

Showing clip that is hammered into the toe, sometimes causing seedy toe.



VIEW OF A FOOT.

Showing toe pared to receive the clip to avoid seedy toe.

V. Pricking from Nails.

Causes.—Pricking may come from a nail running into the quick when shoeing, or a nail may be picked up in the street. It is often done by the horse stepping on a piece of board containing a nail, and the nail is often pulled right out again when he steps off the board, or the nail may be broken off inside.

How to know it.—Sudden lameness will tell you that something serious is wrong. Pull off the shoe and examine the foot carefully. If one of the shoe-nails has punctured the quick, it will be moist and black. If a nail is found anywhere in the foot, pull it out carefully, so as not to break it off. If it *should* be broken off, pare away the hoof around it, and get hold of it with nippers and pull it out.

The lameness will be greater or less, according to the amount of injury done; if the nail wounds the tendon, that plays over the navicular joint in the foot, or pierces the navicular joint, the lameness will be very great, long continued and sometimes permanent. In many of these cases there is high fever, great pain, restlessness, blowing, redness of eyes, and the horse will not lie down. He will paw or continuously raise the foot. There will be loss of appetite in some cases, and not in others; the flanks will be tucked up, and every evidence of intense pain will be shown, especially if the wound is in the hind foot, and more especially if the navicular joint is punctured.

In that case there will be a discharge of joint oil, a yellowish watery matter, which clots like blood soon after running out. When dressing it, you will find clots of yellow-



PRICKING FROM NAILS.

Showing the shoe partly pulled off and nails pricking the foot when the weight comes down.

ish, amber-colored matter on the poultice. In bad cases the leg swells, sometimes to the body. Great heat is in the foot and leg, and pain is shown if the foot is tapped. There will also be a hard, hot swelling in the hollow of the pastern and around the heels, with great tenderness to the touch.

All these symptoms will be noticed to a greater or less extent, according to the amount of injury done. Cases in which the nail does not wound the joint are usually simple.

What to do.—When you have removed the shoe, and found where the prick is, pare out the hole, and around it a little, to thin the hoof; this will relieve the pressure when it begins to swell. Then turn in a small quantity of solution of carbolic acid, one part of acid to twenty of water, or use a little turpentine. Either will tend to prevent suppuration. Then put the foot into a boot, or bag of linseed meal poultice. Change it once a day and examine the wound each time, to see that any matter that forms can escape. This is very important.



THE SOLE OF A FOOT.

Showing nail wound and how to pare it out.

If it is a mild case, it will get well soon and the lameness disappear, when the horse can be shod and go to work. But if it is a bad case, and much matter forms, it will extend under the hoof and spread. In order to prevent this it is best to remove that part of the hoof which has matter under it. The same rule applies to the frog; sometimes the matter works under the entire frog, and it has to come off, but a new one forms readily.

A hot poultice is best, except when there is an open joint, then put on a cold one instead. At every dressing apply the carbolic lotion, and poultice right over it.

If proud flesh comes up, keep it down with powdered blue vitriol, applied once a day; if it comes up suddenly, as large as your thumb, you can cut it off with perfect safety. Then, when it stops bleeding, dress it with the vitriol. As soon as there is no more matter, and the lameness is nearly gone, leave off the poultice and dress it once a day with pine tar.

If the joint is opened, in addition to the treatment given above spread over the injured part of the foot, and also in the hollow of the pastern, Solid Extract of Belladonna, a piece as large as your little finger-nail, once a day and let the poultice go on cold, right over it. Continue this as long as there is much lameness. If there is much fever, give Nuxture of Aconite Root in ten-drop doses, in a table-spoonful of cold water every two hours until the horse is better.

No change need be made in the shoeing, except to stuff tar and tow over the nail-hole, under the shoe. If nail wounds are neglected lock jaw is very apt to follow.

VI. Acute Founder or Laminitis.

Founder is of two kinds, acute and chronic. It is acute where, when it first takes place, all the symptoms are aggravated and the disease is attended with more or less fever. It is chronic when it has been of long standing and the diseased condition has taken an organized form, will remain as it is and become a part of the organized system, but is not attended by any fever, other than a slight local heat.

The inner surface of the wall of the hoof has horny leaves or laminae, very fine and near together, running up and down. On the outer surface of the bone of the foot are sensitive, fleshy leaves that dovetail, as it were, into the leaves on the wall of the hoof. On these leaves is borne the weight of the entire body.

Causes.—Sometimes it is caused by overwork, in which the feet are pounded, and sore up, causing inflammation in the leaves. But founder is usually a metastatic disease—one that originates in some other part of the body and goes to the feet by a peculiar transference called metastasis. It may originate in congestion of the lungs, pleurisy, inflammation of the bowels or peritoneum (the membrane holding the bowels in place) or in almost any part of the body. Drinking cold water when warm, or standing in a draft when heated will cause it.



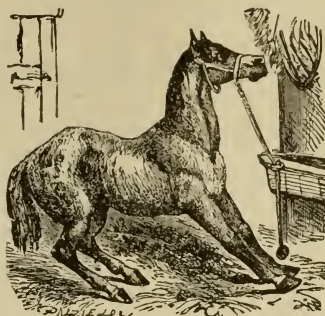
FOOT WITH
A WEAK
SOLE.

How to know it.—The acute form is easily recognized by the horse being in great pain, persistently standing in one place, as if riveted there, it being almost impossible to move him an inch in any direction, especially backward. He absolutely cannot back, but will hang the body back, throwing most of the weight on the hind legs, and stretching the fore legs as far forward as possible. If the animal tries to lift a foot it fails and acts as though the foot were fastened to the floor.

The pulse is quickened, temperature raised, the mucous membranes become red and injected; the breathing is quickened as though there were some lung trouble; sweating is profuse, he will not lie down, and the appetite is lost for the time. The characteristic symptom is the inability to back; if you try to force the animal to back, it will swing the body back, without moving the feet. When thoroughly exhausted from standing, the horse will drop down, and will lie much of the time afterwards.

The inflammation in the bones of the hoof is followed by an effusion of water which severs the connection between the leaves by maceration,

letting the toe of the foot drop down, forming pumiced foot, if it is **not** promptly treated. Pumiced foot is incurable.

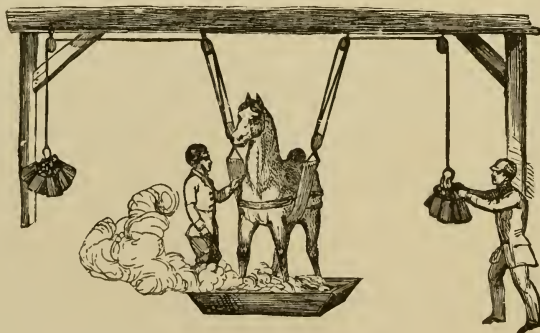


POSITION TAKEN IN ACUTE FOUNDER.

Sometimes the inflammation goes on to suppuration. Matter forms and extends around the hoofs, often causing them to drop off, which will take place in the course of three to six weeks.

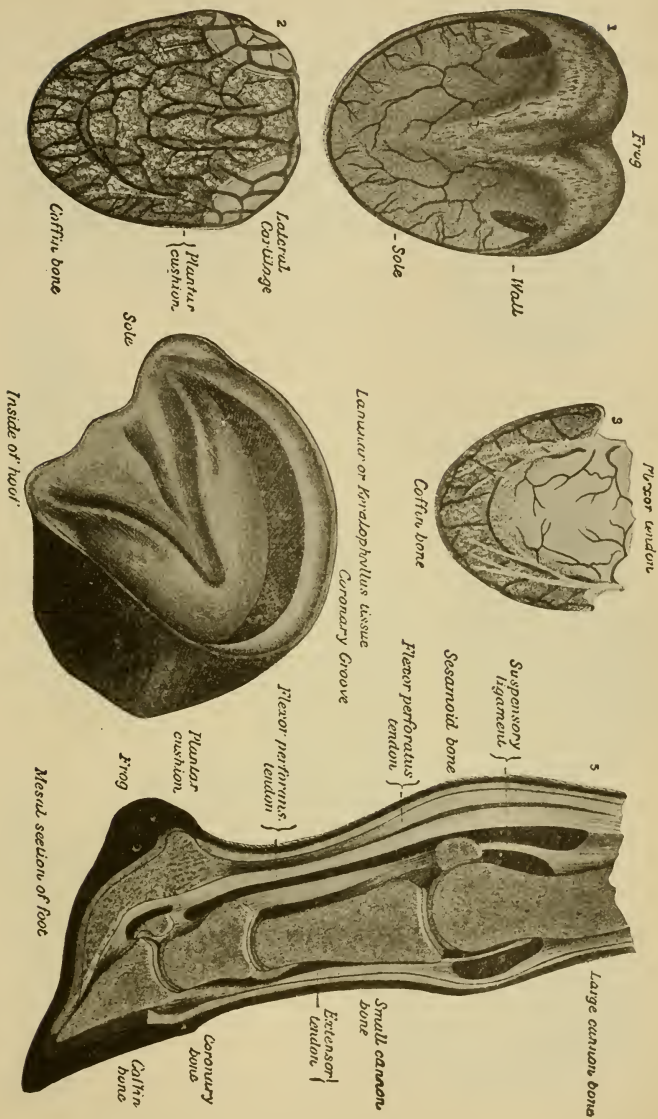
Acute founder is often fatal by the excessive fever, by the absorption of pus into the system, causing pyemia, or by the extreme weakness that follows a long, lingering case.

What to do.—Give a dose of Raw Linseed Oil, one Pint, then pull off all the shoes and pare down the walls of the bare feet, so as to let him

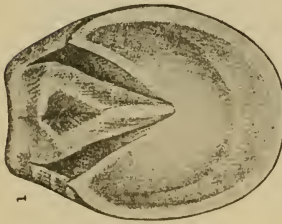


A CONVENIENT WAY OF SOAKING THE FEET IN HOT WATER IN CASE OF FOUNDER.

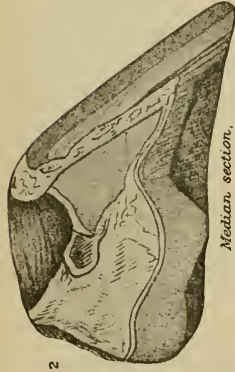
stand on the sole and frog. If the feet cannot be raised to remove the shoes, lay him down and then remove them. Then, if standing, put him into a hot foot bath all around, one or two feet at a time. Let the water



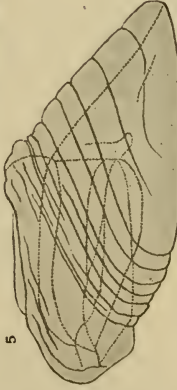
ANATOMY OF FOOT.



Foundered foot.



Median section.



Skeleton of hoof showing cavity occupied by the foot.



Same foot as shown in fig 1.



Same foot as shown in fig 5.



Median section.



Bottom of foot shown in fig 6.

VARIOUS STAGES OF FOUNDERED FEET.

be hot for each one, and with a little mustard in it. Bathe the legs with it as high as the knees and hocks. Leave them in as long as the water remains hot; then take them out and put each foot into a linseed poultice, hot and soft, and bandage the legs with flannel. Repeat this morning and night for two or three weeks, or until the soreness is nearly all gone from the feet. Then stand him in a clay puddle, daytimes, and take him out of nights, and continue this as long as there is any stiffness. It will need to be continued, in most cases, for a month or more. Leave the shoes off till he is ready to work again. As soon as the feet are well put into poultices, begin on the following mixture :

No 4. 1 Ounce sweet spirits of nitre,
 1 Drachm tr. aconite root,
 1 Ounce potash nitrate,
 ½ Pint water,
 Mix.

Give a tablespoonful every two hours, until the fever abates and the patient becomes comfortable; then drop off to three times a day. Continue this for about a week, or in a very bad case, ten days. Feed lightly on warm mashes, scalded oats, grass, &c.

VII. Chronic Founder or Laminitis

How to know it.—The chronic form is a modification of the acute. In bad cases you will notice the difficult backing; lameness; pointing of the feet, first one and then the other; the horse goes with a short, shambling gait, as though the legs were all stiff, and the shoulders are



ACUTE LAMINITIS (Foundered).
 (Feet close together).

thrown forward, giving the chest the appearance of being drawn in. Hence the mistake some make, in supposing the horse to be chest-foundered. There is no such thing, it is always in the feet.

The shoes will be worn off more at the heels, and when pointing them he will extend the feet and rest them on the heel, turning the toes up as much as possible, because the trouble nearly all lies in the toes.



A DEFORMED
HOOF.

With rings indicating sub-acute or chronic founder.

Horses with chronic founder will choose the soft parts of the road, but will avoid the water and mud holes as much as possible. In feeling of the feet you will notice them very hot nearly all the time, and there will be rings on the hoofs, from uneven growth of horn. The feet will very soon become much contracted and the hoofs brittle.

What to do.—You cannot do anything to cure it, but it can be alleviated by keeping the feet as cool and soft as possible with poultices, clay puddles and foot baths.

In addition, rub a little fly blister around the coronets once a month, and reset the shoes often.

VIII. Pumiced Feet.

Causes.—When the inflammation in the feet, from acute laminitis, is neglected, or allowed to run on several days before the proper treatment is applied, the connection between the sensible and insensible laminae, or leaves, is destroyed by the effusion that accumulates between them and soaks them apart, letting the toe of the bone tip on to the sole, pushing it down to the ground, or nearly so, and making the lower surface convex instead of concave, as it should be. Sometimes the toe of the bone will be punched quite through.

How to know it.—Take up the foot, and instead of seeing a nice, cup-shaped sole, you will find it bulged down towards the ground, making it oval the wrong way. If the bone is punching through, you will notice it, and it will leave no doubt in your mind as to what it is. The horse will be lame with all the characteristic symptoms of chronic founder.

What to do.—Nothing can be done to cure it, but if it is not very bad, careful shoeing, to keep all pressure off the sole, by means of a shoe, well concaved on the bearing surface, will help to keep him on his feet; then, by keeping the feet as cool as possible, he can be made serviceable for easy work.

When the toe of the bone pushes through, he is of no more use, and might as well be destroyed, to mercifully put him out of his misery.

CHAPTER III.

FEET OF THE HORSE AND THEIR DISEASES, CONTINUED.

I. THRUSH.—II. NAVICULAR DISEASE.—III. CONTRACTION OF THE FOOT.—IV. GRAVEL.—V. CANKER.—VI. CALKS.—VII. FRACTURE OF THE BONE OF THE FOOT.—VIII. STONE BRUISES.—IX. SIDE BONE.

I. Thrush.

Thrush is the name given to a disease of the frog. It is a rotting or ulceration of the frog, and is attended with a very offensive, black, watery discharge. The frog rots completely off sometimes, and extends down in the cleft between the heels, to a depth of from half an inch to two inches.

Causes.—Uncleanliness, standing in a filthy stable, especially in their own excrement. The filth remaining in the foot a long time and excluding the air, sets up decay which runs into ulceration.

How to know it.—The ragged frog, offensive smell, black discharge, deep cleft between the heels, which causes them to drop in towards each other, making them look very much contracted, are evident signs. In bad cases the animal sometimes goes lame, but not in mild cases. Still, great harm results from neglecting it, on account of the injury to the shape of the foot.

What to do.—Trim off all the ragged parts of the frog, clean out all the holes and crevices with a case knife, or some similar instrument, then apply a linseed poultice, with charcoal powdered over the surface. After twenty-four hours clean it all off, and dress the affected parts with calomel well introduced into all the cracks, with the case knife. Repeat this once or twice, letting a day intervene between the applications. When it is all dried up, dress the part with pine tar.

Prevention.—Pick out the feet well, each day, to let the air in around the frog, which is necessary to keep them healthy.

II. Navicular Disease.

One of the tendons of the leg (*the flexor pedis perforans*) passes down the back of the leg to the foot, and around beneath the navicular bone and joint of the foot, that lies directly above the frog. The tendon, passing between the bone and the frog, attaches itself to a rough hollow on the sole of the coffin bone. Disease in that part of the tendon, bone or joint is navicular disease.

The tendon is inflamed, sore and swollen; the inflammation extends to the joint and from that to the bone, which becomes rough and porous from having its fatty portion absorbed. The edge sometimes gets so sharp and rough as to saw through the tendon. This will let the fetlock down onto the ground, and the toe will turn up.

Causes.—It is caused by a very severe sprain of the tendon in its lower portion; any severe bruise on the frog or heels; the prick of a nail entering the foot far enough to wound the tendon or joint; or it might be caused by great contraction, the hoof pressing on the ends of the navicular bone, interrupting nutrition, thereby setting up disease.

How to know it.—There will be lameness of a peculiar kind. In the earlier stages the horse will go out quite lame, from a dryness of the joint, but will improve as he goes farther, though not so as to go sound; for the tendon being injured it would be impossible for the lameness to disappear altogether with exercise. He will wear the shoes most at the toes, will point the feet when standing, alternating them if both are affected, and rest them on the toes.

As the disease progresses, the gait becomes short, and the horse is liable to stumble, going too much on his toes, forming lameness known as groggy lameness.

Upon pressure of the thumb down into the hollow of the pastern, between the heels, tenderness will be noticed, and usually some swelling; the hollow will be filled up, and the pastern will be straightened up, nearer the perpendicular than is natural, and the knees will soon begin to go over.

What to do.—When the first symptoms are noticed, viz: slight lameness, with inclination to stumble, going out a little lame and soon warming out of it, tenderness to pressure in the hollow of the pastern and to tapping on the frog and heels, take off the shoes, pare out the feet well, open the heels, reduce the frog a little, and put on a wide-webbed, open shoe with the heels raised half an inch, to take off the bearing from the heels and frog, and to relieve the tension on the tendon. Then put the foot into a hot, soft, linseed poultice; change it once a day, and continue it right along for a couple of weeks.

If matter should show itself anywhere, you may be sure you have made a mistake in the disease. The matter must come from a nail or a corn, for matter never shows itself in navicular disease. Trace the pus, if any, to its origin, and treat it as prescribed for Pricks from Nails, and Corns.

After ten days or a fortnight, if the horse is better, take off the poultice and apply a fly blister to the hollow of the pastern, if it is swollen;

if not, let it alone. After the blister has been on for twelve hours, smear fresh lard over it. Continue this once a day, till the scabs come off; then turn him out to grass, with the shoe on, but reset it once a month, with the same directions carried out as given above.

If it is impracticable to turn to grass, keep the foot soft for a couple of months, by soaking in a foot-bath, or poultice-boots occasionally. He had better not be worked or driven during this treatment. Even after you think he is well, the high heel had better be continued for a couple of months.

If this does not cure, the next thing to be done is to have a frog seton inserted. This requires the skill of a qualified veterinary surgeon, and the foot must be kept in a poultice boot six weeks. A long rest and proper shoeing afterwards will also be necessary.

In all chronic cases, or those that will not yield to treatment, all there remains to be done, is to perform neurotomy. This also requires the skill of the surgeon; it never should be done, except as a last resort, and when the horse is useless from incurable lameness, from this or any other disease in the feet.



DIAGRAM.

Showing the course of the nerve that is severed in neurotomy. *a* is the nerve leading to frog.

III. Contraction of the Foot.

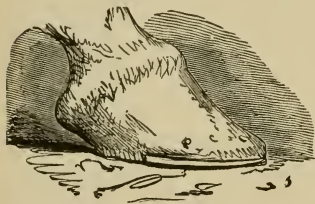
Causes.—Contraction is thought by many to be an original disease, coming on without any departure from a healthy foot previously; but this is a mistake, except in very rare instances. It is nearly always the effect of some other disease, especially when bad. Contraction accompanies navicular disease, corns, founder, sprains of the tendons, ligaments and muscles of the leg or shoulder. Any long-standing lameness, of the foot or leg, is always accompanied by contraction of that foot from the continual rest it gets in being favored every time the horse stops; when standing, he always points that foot, and rests it till compelled to start again. At the same time, the healthy foot expands on account of getting more than its share of the work; so it is only a question of a short time for the feet to become very uneven, one small and the other large; and they will no longer be mates. When you see this condition you may look for chronic lameness; it is most likely to be in the feet, either navicular disease, or chronic founder.

But contraction, to a certain extent, is the inevitable result of shoeing. A colt's foot, before being shod, is large, round and open-heeled, the quarters spread out like wings, and the whole foot on the under side has

the appearance of a large saucer. In shoeing, the quarters have to be narrowed more than the toe, because they are spread more, and in their expanded condition cannot bear weight on a shoe; the toe gets broken and worn off, while running, so it never spreads to the same extent as the quarters.

The cause of the colt's foot being so round and open is, that he has run on the turf without shoes, the feet have gathered so much moisture, been kept so soft, stepping on the earth or into the mud, that they act like a sponge, being compressed when stepped on, and expanding as soon as the weight is relieved, so that the hoof spreads a little every time the foot is raised. Another reason is, the foot being in moisture nearly all the time, the hoof grows faster, and extra fast growth is inclined to spreading, whereas a slow growth is inclined to contraction; and as soon as the colt is shod and put to work the slower growth of the hoof begins, and with it contraction.

Good shoeing will do a great deal towards preventing contraction and keeping the feet in good condition; and bad shoeing will ruin a foot in very little time.



SHOE LEFT ON TOO LONG.

Causing the hoof to grow over the shoe at the quarters, and to contract.

There is no more prolific cause than leaving the shoes on six, eight or twelve weeks without being reset, for the shoe, being nailed to the hoof, compels it to grow down in the form prescribed by the shoe. And when it is removed, and the hoof pared down to its natural size, you will find the heels very much contracted. Another common cause is standing on

hard floors, allowing the feet to become all dried up.

What to do.—When there is no other disease in the foot, and contraction comes from bad or neglected shoeing, pull off the shoes, pare the feet down liberally, so as to be able to press the sole with the thumb, open the heels right up to the soft parts, rasp off the quarters quite thin, leave the frog as large as possible, in fact do not touch it at all. Then rub in a little fly blister to the coronet, smear the quarters with hoof ointment once a day, and turn out to pasture on soft ground. If you do not wish to turn the horse out, the shoes may be put on again; in doing so, let them be plain shoes with no calks, medium weight, perfectly level on the bearing surface, and beveled off to avoid bearing on the sole. Reduce the quarters so as to relieve them of any bearing on the shoe,

and let the frog come right down to the ground. Set the shoes once every three or four weeks, and repeat the above treatment each time, and in the course of three or four months, you will have a decent foot. There are several methods of spreading the heels by force, but in the long run they are all impracticable, and cannot be recommended. In addition to the above treatment, the feet may be packed with any soft packing, or a wet sponge held to the sole by any one of the many devices for that purpose; or the horse may be stood in a soak tub of either hot or cold water a couple of hours in the forenoon, and the same in the afternoon; or stand him in a clay puddle, as prescribed for founder.



A LOW HEELED, FLAT FOOT.

Seldom afflicted with contraction



A STRONG, UPRIGHT, HIGH HEELED FOOT.

Predisposed to contraction.

IV. Gravel.

Causes.—Gravel is apt to work up into a sore of any kind in the foot, and cause great pain, irritation and lameness. It often gets into a corn, or into a nail hole, made either by a prick in shoeing, or by a nail picked up in the road. It may get into a quarter crack, calk, or any wound whatever, and always causes an increased inflammation, and aggravates any existing difficulty.

How to know it.—Examine the wound carefully, to avoid pushing the gravel farther in. It will be readily detected by feeling hard, grating grains in the wound, or by the dirty appearance of the wound itself; it will look black and unhealthy.

If neglected, it will work up through and break out at the top, forming a quittor. It sometimes gets into a crack that forms between the wall of the quarter and the sole, either from the sole shrinking away from the wall, or the wall being broken away from the sole.

What to do.—Trim the hoof away around the opening, so as to have plenty of room, then wash it out, rinse it out with a syringe, by shooting

the water into the hole with some force ; then dig it all out carefully, and inject into it carbolic lotion :

No. 5. 1 Part carbolic acid,
 30 Parts water.
 Mix.

Then apply a poultice, hot and soft. Repeat this once a day till the hole is filled up with sound, healthy flesh. Then apply the treatment prescribed for corns.

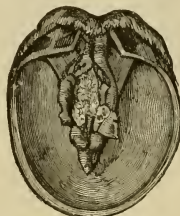
V. Canker.

When any extensive disease of the feet necessitates the exposure of much of the soft structures, instead of the flesh becoming nicely covered with hoof, and coming out smooth, it sometimes sprouts up into a shreddy, leathery substance, that will not grow together and form hoof, but remains spongy, enlarged, soft and tender.



CANKER OF THE SOLE.

The horny sole being removed.



CANKER OF THE FROG.

The horn laid back to show the diseased parts.

Causes.—Neglected or badly treated wounds, they being also affected by the air in which the horse is kept during the healing of them ; low, damp, dirty stables, without drainage or ventilation ; and the horse standing in his own excrement during their treatment.

It is more common among draft horses and those of a phlegmatic nature.

How to know it.—By the uneven surface, growing up in leaves that extend down, sometimes from a half to three quarters of an inch.

What to do.—Bad cases are usually considered incurable ; when such exist, the foot never can be made to grow into a fine, solid hoof. But in most cases the disease will yield to proper treatment.

Pare away all you can without bleeding it ; then dress it with powdered blue vitriol. Keep the sole and all diseased portions dry ; this is most important, as moisture prevents a solid growth, and promotes a fungous growth. If any pus comes out between the leaves, insert, well down into

the hole, a stick of lunar caustic. Dress it in this way once a day till the leaves are all reduced to a solid surface, then, if it is raw flesh, and not too prominent, apply burnt alum or air-slacked lime, alternating them occasionally with the vitriol. Keep the sore part perfectly dry all the time.

When it is well started, and good quality of hoof is growing, dress it with pine tar and tow. The horse may be shod as soon as it is well enough to be dressed with the tar; before that time the shoe is better off, the foot being in a canvas bag and the horse running in a box stall.

VI. Calks.

Causes.—Calks are cuts and bruises on the coronet, or soft parts above it, caused by one foot stepping upon the other, and the calk of the shoe, if sharp, cuts into the flesh. It is most common in fall, winter and spring, when mud and snow are deep · the horse getting stuck is almost sure to step on his own feet.



CALKS OR TREADS ON THE CORONET.

What to do.—If the wound is in the skin, and of any length beyond one inch, take a stitch in it, or more if needed. Put the stitches half an inch apart, first clipping off the hair along the edges of the wound. If any artery is cut, so as to bleed a stream, put a dry sponge over it and bandage with a coarse cotton bandage, tight; leave it on ten or twelve hours, then remove and dress with the carbolic lotion:

- No. 6. $\frac{1}{2}$ Ounce carbolic acid,
 1 Pint water,
 Mix.

Sop it on and bandage just tight enough to keep the parts in their proper position. Remove the bandage twice a day, wash the wound with warm water and castile soap, and dress with the above lotion.

When the edges are united, or if the stitches tear out, which they are very apt to do, and expose a raw surface, apply the White lotion:

- No. 7. 6 Drachms sulphate of zinc,
 1 Ounce sugar of lead,
 1 Pint water,
 Mix and shake.

Dress the wound with this three times a day, washing it as often as necessary to keep it clear of pus. If the wound is inclined to gape open, continue the bandage a few days.

If the calk is in the coronet, running down under the hoof, it will fester, and pus will accumulate and cause great lameness; the part will swell, and will be red, hot and tender to the touch; the lameness being so great in some cases as to prevent the animal putting the foot to the ground at all.

Pare away all ragged edges, and as much of the hoof, following the sore down, as confines any pus; remove any hair or other foreign matter that may have got into it; then apply a poultice, after dressing with the carbolic lotion, No. 6. Change the poultice twice a day, using the carbolic lotion each time, and examine the wound carefully to ascertain if there is a sack or pocket containing pus below where it is pared out. The hoof needs to be reduced to the bottom of the wound and kept so. Continue the poultice until the hole fills up, and the lameness is nearly or quite gone; then discontinue the poultice and dress three times a day with the White lotion, No. 7.

Lay the horse up till the wound is well enough not to be injured by sand getting into it. If any proud flesh springs up, burn it down with burnt alum.

When the hoof is growing down, apply a mild blister of flies to the coronet, and trim the new growth from time to time to keep it smooth.

The flesh which fills up the hole in the hoof must be kept down even with the deep edge of the old hoof, otherwise the edges press against the flesh and prevent it from healing.

VII. Fracture of the Bone of the Foot.

Causes.—This does not occur very often, but we see it occasionally. It is caused by striking the foot with great force against any hard substance, especially if the foot receives the blow on the quarter. The bone of the foot may also be fractured by being run over with a loaded wagon; or by being stepped on by a heavy horse, the foot coming on the top of the hoof in front breaks the pyramidal process, (the point rising from the center of the coffin bone.)

How to Know it.—Extreme lameness comes on suddenly, soon after the accident, and increases with time. The foot swells around the coronet, and is very tender, and the horse will not put any weight on it at all.

What to do.—Remove the shoe and ascertain, if possible, the location of the injury by pressure, tapping and pinching; then pare or file away

the hoof over the spot, so as to give it a chance to swell and relieve the pressure. Put the foot into a poultice; change it once a day, and relieve the pain as much as possible by paring away all the hoof you can over and around the part; it will grow again long before the horse is fit to work. If any hole forms for the escape of the pus, you may be sure there is a broken piece of bone that is acting as an irritant, and must be removed. Follow down the hole, paring away the hoof as much as is necessary to remove all detached pieces, for every piece that is separated from the main body will have to come out.



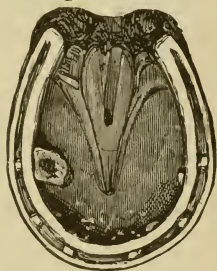
DIAGRAM OF FOOT.

Showing the position of the coffin bone, which is often fractured.

When all the pieces are removed, dress with the carbolic lotion, No. 6, twice a day, letting the poultice come over it until the discharge is stopped, and the hole filled up with flesh. Then dress it with the White lotion, No. 7, three times a day. Trim the new hoof as it grows to make it grow down as evenly as possible. When sufficiently healed to be safe to turn him out, do so, and let him run two or three months. In most cases the wound will fill up and heal with very little trouble, and the foot will be nearly as good as before.

VIII. Stone Bruises.

Causes.—Bruises are often found on the feet, especially around the heels. They are usually caused by stepping on round or pointed stones, or other hard substance. Sometimes they are slight and get well without any treatment other than a day or two of rest. But sometimes they result seriously, when the bruise is so deep that suppuration takes place, and is liable to spread or work up through and break out at the top, like a corn. Sometimes the bruise is so severe as to destroy the life of the soft parts underneath, causing them to slough out bodily as soon as the hoof over the spot is removed, leaving a hole large enough to put your finger into. Sometimes it comes by a very hard blow on the heel of the shoe, which bruises the quarter, and all of its attachments, from the bone, so that a core as large as the end of your thumb sloughs off the wing of the coffin bone. When the injury is so great it must be promptly treated, or it will break out at the top and form a quittor.



BOTTOM OF FOOT.

Showing a stone caught between the sole and shoe.

How to know it.—There will be lameness, according to the extent of the injury. Upon examination a tender spot is found on the sole or frog, or on one of the heels. Lameness increases from day to day. When the shoe is removed no nail hole is found, nor any discoloration denoting a corn; but the tender spot exists; it is not where tenderness from navicular disease would be found, therefore you come to the conclusion that it is a bruise.

What to do.—The shoe being removed, put the foot into a poultice for twenty-four hours. Then pare down on the bruised spot and liberate any pus that may have formed; if none is found without cutting too deep, replace the poultice and try again the next day. A pair of pinchers will help to locate the bruise by pinching all around the foot. If the tissue is bruised off the wing of the coffin bone, it will come out like a core when it is sufficiently rotted and the sole is cut away underneath; if it is not cut away the disease will go on and break out at the top of the hoof.



DIAGRAM OF A FOOT.

Showing position of wing of coffin bone, often badly bruised and sometimes fractured.

When the core is taken out, dress it with the carbolic lotion, No. 6, and replace the poultice. Continue this treatment till the hole is filled up with sound, healthy flesh. Then dry it up with powdered blue vitriol by applying it once a day; omitting the poultice and leaving the sole dry, but keep the foot cool and soft with swabs tied around the wall of the foot, and wet with cold water several times a day. When dry, dress with tar and tow and put on the shoe so as to protect the weak spot; do not have any bearing on that portion.

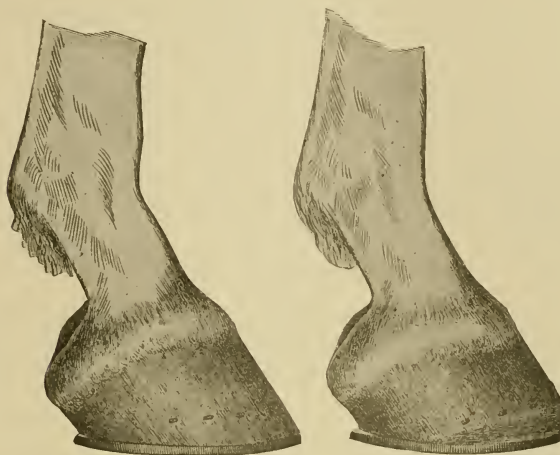
IX. Side Bone.

Side bone is a hardening of the lateral cartilages of the fore feet. These cartilages are situated in the quarters of the feet, one on each side, and are attached to the wings of the coffin bone. They extend above the quarters of the hoof, are covered only with the skin, and can be felt readily; they are found to be very pliable in health, but are perfectly solid in cases of side bone, being ossified. They are the result of inflammation in the lateral cartilages.

Causes.—Any severe injury to the quarter, by the horse stepping on his own feet, getting the foot caught under a root in a woody pasture, contraction of the heels setting up inflammation by undue pressure, quittor, very severe nail wounds, or severe bruising of the heels; and it often accompanies navicular disease.

How to know it.—The quarters are enlarged upwards from the hoof, are as hard as bone, and perfectly inelastic. In the early stage there will be heat, soreness, pain upon pressure, and lameness.

What to do.—When the quarters have been bruised or injured, in any way, foment with hot water in cold weather, and cold water in hot weather. Apply the water as continuously as possible, and wrap them in woolen

*Right fitting.**Wrong fitting.*

RIGHT AND WRONG FITTING SHOES.

cloths saturated with water between the times of bathing. When the soreness has left them, and there is no more lameness, discontinue the water treatment, and apply a fly blister over the spots. This will cause any remnants of inflammation to be absorbed. After they are once thoroughly hard they seldom or never cause any further lameness, but there will always be a clumsy, stiff action, due to a want of elasticity.

CHAPTER IV.

SHOEING AND CARE OF THE FEET,

- I. WHAT A SHOER CAN DO.—II. HOW TO PREPARE THE FOOT FOR THE SHOE.—III. WHERE THE BEARING SHOULD REST.—IV. WEIGHT OF SHOES AND HOW TO FIT THEM.—V. CARE OF THE FEET IN THE STABLE.—VI. THE FLOOR OF THE STALL.

I. What a Shoer Can Do.

Horse shoeing is a trade in which a great deal of skill can be exhibited. A good shoer can keep the feet in the very best condition as far as shoeing is concerned, and a poor one can ruin a set of feet in a very short time.

II. How to Prepare the Foot for the Shoe.

The foot should be carefully prepared by being rasped down to its proper size and all superfluous growth of wall and sole removed. To do this requires judgment, for there are scarcely two feet alike. Some grow faster than others; some are high-heeled and some low, some have thick soles and are very concave, while others have thin soles and are flat. Flat-footed horses have the latter, and the extreme in the other direction is seen in the club-foot. In flat feet the toes are long and thin and are spread out, the heels low and soles thin. In club-feet the toe is short, the wall straight, almost perpendicular, the heels high and strong, and the soles thick. The flat foot needs very little paring and is seldom afflicted with contraction, while the strong foot is very prone to contraction and needs considerable trimming to prepare it for the shoe. The flat foot is more subject to laminitis, bruises, pricking and gravel; the strong one to corns, quittor, contraction and navicular disease. Both the flat foot and the strong foot are objectionable; the medium is the best foot.

III. Where the Bearing Should Rest.

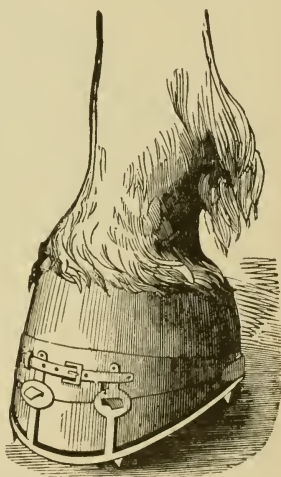
In paring the foot for the shoe, the wall wants to receive the most of the bearing, though the sole near the wall can take some of it. The heels ought to be lowered the least trifle to reduce their bearing, and should be opened about half way up to the hair in a V shaped manner to allow the foot to expand a little every time the weight comes on it, so as to avoid as much as possible the evil of contraction, which, as already stated, is the inevitable accompaniment, more or less, of shoeing in all cases. If there are any ragged edges on the frog, trim them off, otherwise the frog need not be touched.

IV. Weight of Shoes and How to Fit Them.

In making the shoe it should be perfectly level on the bearing surface, beveled off gently all around from about three-eighths of an inch from the outside to the inside, so as to avoid giving any bearing on the sole, and to facilitate the removal of any gravel that might work in between the shoe and sole. Let it be of good length, and of a weight to suit the horse; some require heavy and some light shoes. Fore shoes vary in weight from ten to twenty ounces; hind ones, from eight to twelve ounces. On the ground surface it is well to bevel towards the centre, thereby widening the web which protects the sole from bruises and pricking from nails. Let the toe be rounded off for driving horses to prevent stumbling, and give them as little calking as their work will allow. The driving horse is usually better on a plain shoe, while the draft horse needs calks to give him a purchase on the ground so as to pull heavy loads. The hind shoes are best with a small toe calk, and the heels raised by leaving the shoe a little thicker to level it up to the toe calk.

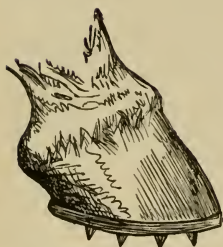
Shoeing for diseased feet, (pathological shoeing,) has been treated on in connection with the diseases of the feet in the two preceding chapters.

In finishing off a foot with the rasp, after shoeing, the wall should not be rasped above the nail clinches, as it destroys the oily, unctuous covering that is there to keep the fibers tough and pliable, and prevent sand crack.



THE CRAMPON, TO PREVENT HORSES
SLIPPING IN FROSTY WEATHER.

V. Care of the Feet in the Stable.



A PLAIN SHOE.

With large, sharp-headed nails for winter use.

Care of the feet in the stable has a great influence on their health. Horses that are kept on floors and pavements continually, and even country horses in dry weather, should have the feet either soaked out in a foot bath or clay puddle, or packed with moist sponge or oil-cake meal two or three times a week. If it is not done, they dry and contract from want of moisture, get brittle, and have sand and quarter cracks, and lose nearly all toughness. When the hoof is brittle and inclined to crack, in addition to the above, a hoof ointment, made and applied as follows is beneficial :

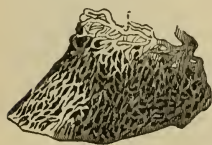
No. 8.

4 Fluid ounces pine tar,
4 Fluid ounces whale oil,
Mix.

Rub a little well into the coronet and upper part of the hoof once a day. If the ointment gets too thin in warm weather, a couple of ounces of mutton tallow may be added to give it a better consistency.

VI. The Floor of the Stall.

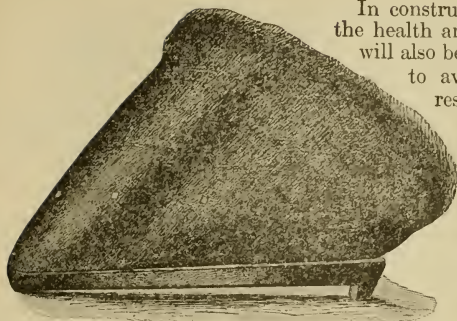
Confinement to the stable, even under the most favorable circumstances, has a tendency to produce diseases of the feet, such as are comparatively rare among farm horses which enjoy constant exercise at work or running in the pasture. The anatomy of the horse's foot is such that exercise is absolutely necessary to keep up the circulation of blood under the hoof, and the bad effects of inaction are only aggravated by requiring the animal to stand on an unnecessarily hard surface. The confined horse endeavors to supply the lack of outdoor exercise by stamping and pawing, and should have a soft surface of earth or sawdust to paw upon.



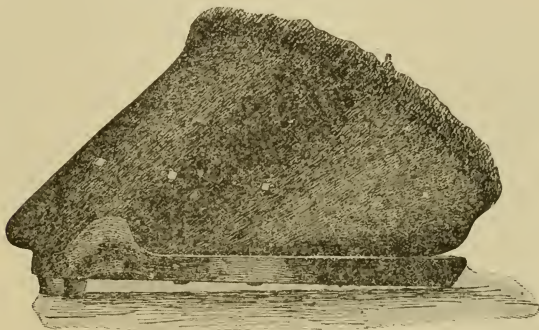
VEINS OF THE HORSE'S FOOT.

The network of veins without valves situated immediately under the secretive membrane of the hoof.

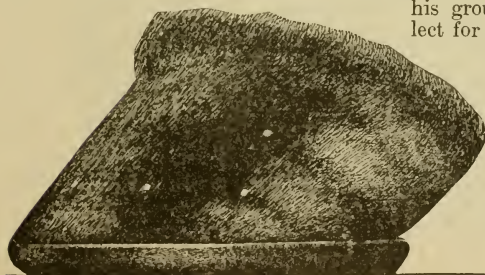
Pawing and stamping serve the specific purpose of keeping the blood moving under the hoof ; crib-biting on the other hand is often merely an exhibition of the restlessness an active animal feels at being cooped up.



Side view of a Fore Hoof shod so as to quicken the action in a forger. Note the short shoe, heel calks inclined forward to the rolled toe.



Side view of a Short-toed Hind Hoof of a Forger, shod to slow the action and to prevent injury to the fore heels by the toe of the hind shoe. Note the elevation of the short toe by means of a toe calk and the projection of the toe beyond the shoe. When such a hoof has grown more toe, the toe calk can be dispensed with and the shoe set farther forward.



Side view of Hoof and Shoe. Note the straight toe, weak ring formation running parallel to the coronet, clinches low down, and on a level, length of the shoe, and the under bevel of the toe and heel.

In constructing the floor of the stall the health and comfort of its occupant will also be promoted, if care is taken to avoid having his fore feet rest upon a higher level than his hind feet. The opposite practice, that of building the stall floor to slope from the manger backwards, is too often resorted to for the purpose of securing surface drainage; but it is a blunder to do this. When in the open field and free to choose

his ground, the horse will select for a rest a gentle slope on which he will stand with his fore feet resting on a lower level than that occupied by his hind feet. It is the position in which there is least strain upon the back muscles of the foot and leg while standing—the one in which the horse rests easiest.

CHAPTER V.

LEGS OF THE HORSE, THEIR ACCIDENTS AND DISEASES.

I. BONE SPAVIN.—II. BOG SPAVIN.—III. OCCULT SPAVIN.—IV. BLOOD SPAY-IN.—V. THOROUGHPIN.—VI. CURB.—VII. RING BONE.—VIII. SPLINT.—IX. SPRAIN OF BACK TENDONS OF THE FORE LEGS.—X. BROKEN DOWN.

1. Bone Spavin.

Spavin is an arbitrary name given to disease of the hock joint, in which inflammation is an early symptom. Effusion follows it, and ossification of the exudate forms a bony lump on the joint, usually on the inner side near the front, but it may occur on any part of the joint. It always affects the joints more or less and causes great lameness, which is usually susceptible of a cure, but sometimes defies treatment, and permanent lameness is the result.

The hock joint is composed of a *true hock joint* that works like a hinge,



BONE SPAVIN.

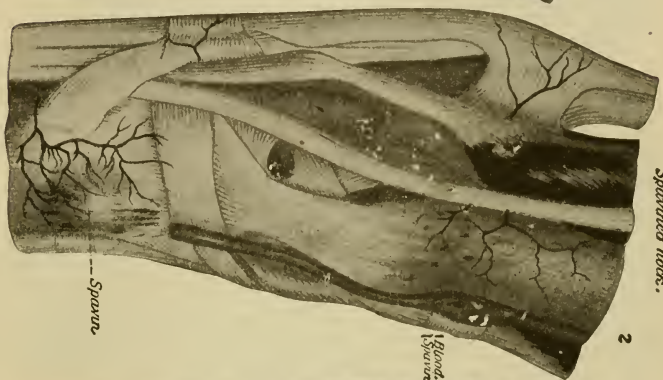
and three flat gliding joints below it before we come to the cannon bone, and on each side of the cannon is a splint bone the same as in the fore leg. The connection between the splint and cannon bones is ligamentous. The spavin usually takes its origin between the cannon and the inner splint bone, and extends up to the joint and around it, and sometimes involving the whole hock, except the true hock joint, stiffening it and interfering with the action very seriously.

Causes.—It is often caused by a sprain of the ligamentous connection between the cannon and inner splint. Sometimes the sprain may affect the ligamentous connection between the cannon and the outer splint, but usually it is on the inner side, on

account of the line of the center of gravity being more to the inside, bringing more weight to the inside than to the outside. It is sometimes caused by a bruising of the joint itself by kicking, jumping, running, pulling heavy loads up hill, bringing great strain on the hind legs.



Sound hock



Spavined hock.

-- Spavin

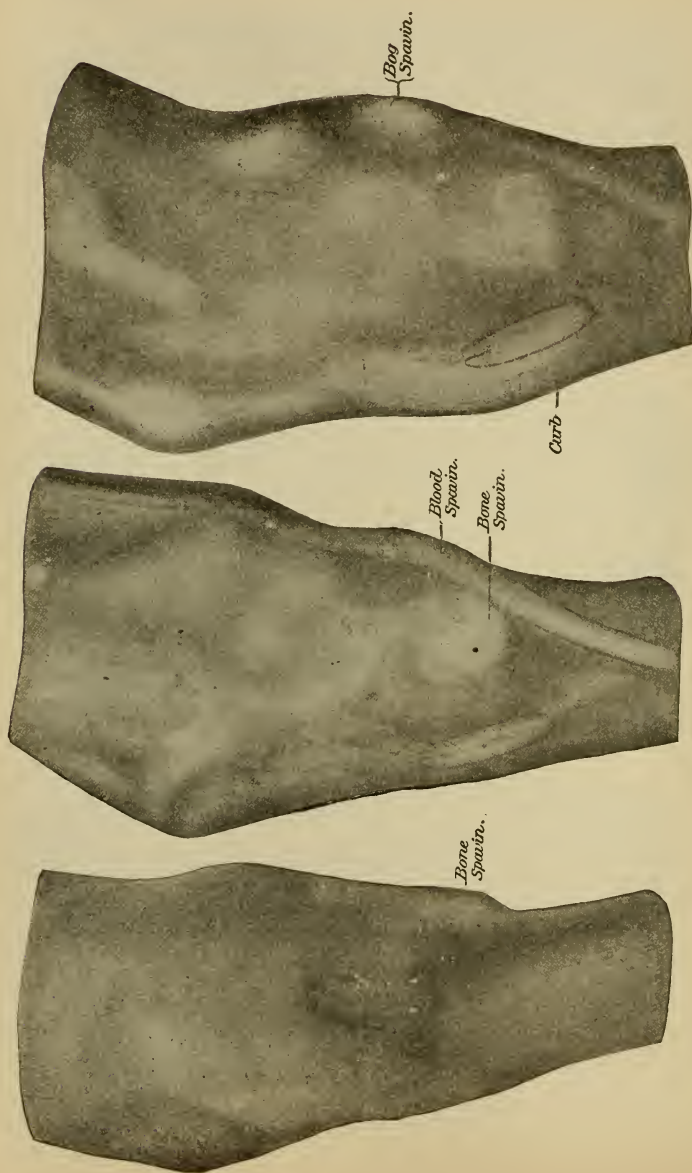
Spavin



Badly spavined hock.

Spavin

BONE SPAVIN. HOCKS, WITH SKIN REMOVED.



THREE DISEASED HOCKS, ILLUSTRATING BONE SPAVIN, BOG SPAVIN AND BLOOD SPAVIN.

The hock on the right also shows a Curb on the posterior part. It is at the boxed outline opposite the Bone Spavin on the adjoining leg.

How to know it.—In the early stage there will be lameness, more or less acute, according to the amount of injury to the joint. The lameness will be distinguished by a stiffness in moving from side to side in the stall, by backing out and going off on the toe of the foot for a few steps, but soon improving with exercise till he will go all right after having gone a few steps, and remains so till stopped and allowed to cool off, when he will go off worse than ever, until warmed up again. The cause of this



CURED BONE SPAVIN.



BONE SPAVIN.

is: By standing the joint becomes dry, and great pain attends the flexion of it, but the exercise excites the secretion of synovia, (joint oil) which lubricates it, and the horse is comfortable till the joint gets dry again.

Upon pressure, a soreness and heat will be found, usually just at the bottom of the joint on the inside, but well to the front. A slight amount of swelling may be noticed, but not much until the *second stage* is reached, when a hard, bony enlargement will spring up and extend more or less, sometimes only involving the splint, cannon and the first bone of the gliding joint. But at other times it extends clear around and involves all the gliding joints, the callos and cuboid parts of the joint, and it leaves bony deposit around the tendons between the splint bones at the back of the hock. The enlargement is best seen by standing at the side of the horse, about a yard from the shoulder, when, instead of the smooth, straight declination of the inside of the hock, you will detect the lump just above the end of the cannon. Sometimes the lump is farther back; then it can be seen better by stooping down in front, and looking between the fore legs. Occasionally it will be seen only on the back part of the hock; ther it usually escapes detection even by experts.

What to do.—If taken when it is in the first stage, before any effusion is thrown out, it can be cured by treating vigorously to remove the inflammation. This is best done by continuous applications of hot water

or poultices ; raise the heels of the foot about an inch and give absolute rest till all lameness and soreness are gone. Then turn him out to grass or straw yard for three or four months.

But if the spavin runs on to the second stage, in which effusion is thrown out and ossification is begun, a good smart blister, well rubbed in after the soreness is taken out by the hot applications, will perform good work in some instances. If it is not improved by the first application repeat it. The blister is made as follows :

No. 9.	$\frac{1}{2}$ Ounce powdered cantharides,
	2 Ounces lard,
	Mix.

Also prepare

No. 10.	2 Drachms red iodide of mercury,
	2 Ounces lard,
	Mix.

Mix the two blisters together and rub it well in, first cutting off the hair. After twelve hours, smear fresh lard over the place. Repeat the lard once a day till the scabs are all off and the skin is nearly healed ; then repeat the blister, and so on till he is cured. This treatment is effectual if begun in time and vigorously applied, and sufficient rest given afterwards. It may absorb nearly all of the enlargements. If this fails, or if the case is allowed to run on to the third or confirmed stage, in which the lump has become thoroughly ossified and the gliding joints more or less incurably affected, the only hope of doing anything to any advantage is to produce ankylosis (stiffness) of the joint. For when the articular surface of the joint is much affected it cannot be cured and restored to soundness, so the only thing to do is to stop the lameness. The most effectual way to do this is to apply the actual cautery (firing iron), which produces so great an amount of artificial inflammation, causes such an increased flow of nutrition to the part, that, when accompanied by rest, it destroys the joints that are affected, by stiffening them. There are several ways of applying the firing iron, but the most common is to pass the iron, with a dull edge, over the part affected, in lines running obliquely each way, forwards and backwards, from a centre line drawn perpendicularly from about the centre of the hock on the inside to a point on the cannon about an inch and a half below the hock. Draw similar lines on the front and back of the hock, and then draw the oblique lines from one to the other, giving it a feathered appearance. In bad cases it is advisable to fire on the outside of the hock, too, as a surer means of removing the lameness, but, on account of the iron leaving scars wherever it touches, this outside application is usually objected to, unless the first firing fails and it has to be repeated ; then it should always be carried clear around. It is the opinion of some authorities that every case can be cured of lameness by repeating the firing, if necessary, half a dozen

times, but it is accepted as a fact, by most surgeons, that when the articular ends of the bones are ulcerated there will be permanent lameness.

Apply the blister, No. 9, well rubbed in with the hand, immediately after firing. Some operators delay the blister till next day, but it is preferable to rub it in before the leg gets sore and swollen from the firing. Tie up the horse's head for twelve hours to prevent him biting it. After twelve hours, grease over, and repeat the application once a day till pus begins to form under the scabs; then wash it once a day with warm water and soap to prevent blemishing by the pus burrowing under the scabs. When dry, rub the grease in. Give him absolute rest in the stable for four weeks; then give him a three or four months' run at grass; and when beginning to work again, let it be gently for some time. While this treatment is going on, it is advisable to have a high-heeled shoe on the foot of the lame leg; let it be raised an inch. When shoeing, after he is well, continue the high calks for a month or two.

There are numerous patented spavin cures in the market, some of which have more or less merit; but as a rule, the above is the only reliable treatment. Some of the nostrums claim to be able to cure a spavin in twenty-four hours without breaking the skin, but they are humbugs of the worst kind. Sometimes very strong corrosive blisters are recommended, such as corrosive sublimate, etc., but they are cruel in the extreme and not as likely to cure as the treatment laid out above, which, being the most humane, although pretty severe, is the best to pursue. When firing, it is advisable to cast the horse to keep control of him and be able to perform a better operation, and the hair should be shaved off.

II. Bog Spavin.

This is the name given to an enlargement of the hock by distension of the synovial bursa. The synovial membrane of the joint becomes inflamed and secretes a superabundant amount of joint oil which distends the membrane and enlarges the joint sometimes to the size of a child's head. It can be alleviated by good treatment, but when once well-distended it can seldom be radically cured, and very many unfortunate animals carry the big joint with them to the bone yard.

Causes.—It is caused by severe sprain of the joint, the inflammation extending to the synovial membrane, and sometimes even to the joint. Sometimes the origin of it lies in the joint itself from severe bruising by concussion when jumping, kicking or being kicked. It is also caused by wounds from being stabbed with the fork by reckless grooms, or pricks from nails in the stall, when a restless horse demolishes it by kicking.

How to know it.—There will be a large, soft swelling on the inner and front aspect of the hock. The swelling is of the same character as wind galls; it seems to be filled with air, but



HOCK JOINT.
Showing the enlargement of Bog Spavin.

it is synovia. In mild cases there is little, and, sometimes, no lameness, but in bad cases there is lameness of a general character, stiffness in the hock, more pain evinced when starting than after a little exercise, heat, soreness upon pressure, and a tendency to get worse rather than better, even with treatment.

What to do.—Bathe it as continuously as possible with either hot or cold water for twelve hours, then apply an oil-meal poultice, hot and soft. Continue the poultice for several days, changing it once a day, and bathing with hot water at the time of changing. When the soreness and lameness are gone apply the following liniment twice a day :

No. 11.	3 Ounces tincture of iodine,
	1 Ounce aqua ammonia,
	1 Ounce turpentine,
	1 Ounce glycerine,
	Mix.

Rub well in with the hand till the skin is quite sore ; then grease it once a day till it is healed, then repeat. Keep it pretty sore for a few weeks, giving perfect rest. Then turn the horse out for a long time.

Some recommend bandages, but they are not practical since they are very difficult to keep on and always chafe the skin above and below, necessitating their suspension from time to time to allow the skin to heal. Puncturing the sack is prescribed by some, but it is very dangerous and cannot be recommended.

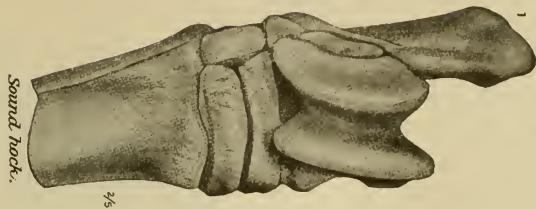
III. Occult Spavin.

Occult spavin is similar to bone spavin in all respects, except that there is no enlargement, and no external evidence of any lesion whatever. The lameness is severe, persistent and of the same character as in bone spavin, the horse going off on the toe, working out of the lameness with exercise in the earlier stages, but the lameness is often permanent through all the subsequent stages.

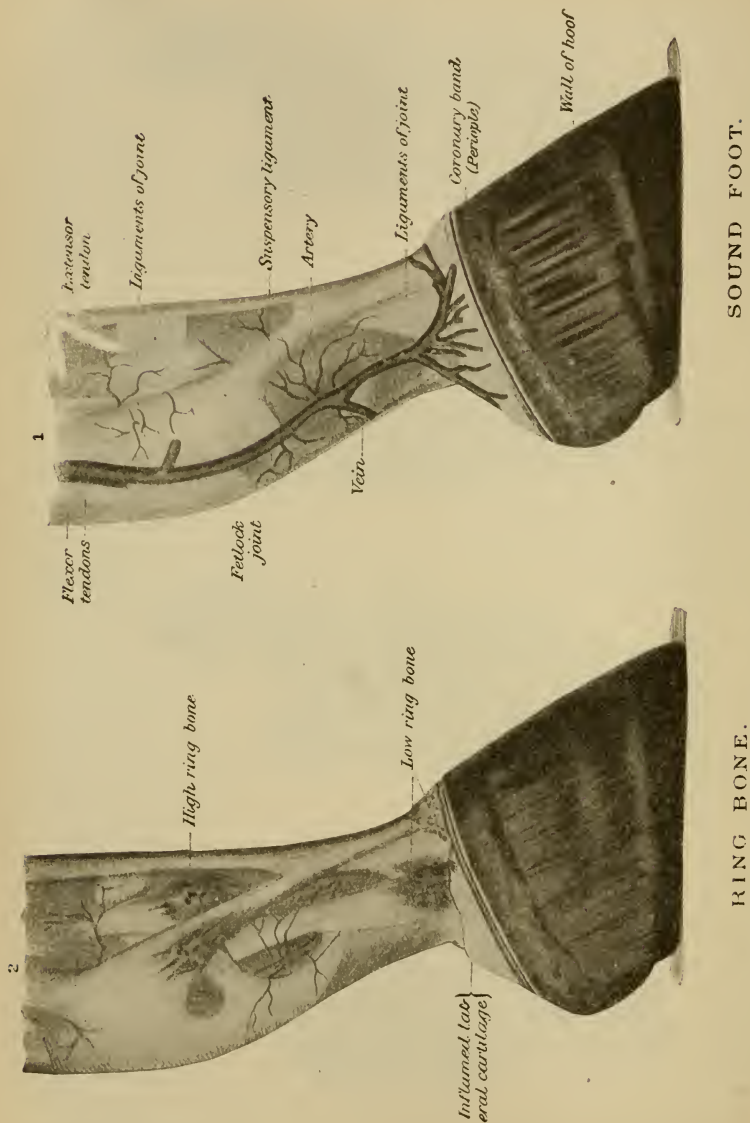
Causes.—Severe concussion on the ends of the bones in the joint

How to know it.—There will be the characteristic bone spavin lameness, but the disease will show no outward marks. A very sure test is to drive the horse enough to warm him up and get the spavin to working well, then let him stand half an hour, then take the toe of the foot of the lame leg in your hand and raise it as high as possible so as to flex the hock joint. Hold it there two or three minutes, then drop it and rush the horse off on a smart trot. If it is spavin he will go off on three legs for a few steps, and bring the toe down first as he warms up again, and after a little will go all right until stopped and allowed to cool.

What to Do.—When it is satisfactorily located give it the same treatment prescribed for bone spavin.



TWO STAGES OF SPAVIN, CURED SPAVIN AND SOUND HOCK.



IV. Blood Spavin.

Causes.—Blood spavin is a distension of the saphena major vein as it passes over the enlargement of bone spavin. The vein is constricted and the blood dammed up to a certain extent, causing a distension of the coats of the vein and giving the leg the appearance of having a very large bone spavin on it. It seldom does any harm.

How to know it.—Stand at the shoulder and view the hock as directed for bone spavin, and you will see the enlargement in the same position as the bone spavin.

What to do.—Upon examination with the hand, the enlargement will be found to be soft and readily rubbed down, which should be done often. This is the only treatment of any virtue.

V. Thoroughpin.

This is of the same nature as bog spavin (distension of the synovial bursa) but occurs between the os calcis, forming the point of the hock, and the rest of the joint. It seldom does any more harm than to form an eyesore. Lameness from it is very rare.

Causes.—It is produced by many of the same causes that are ascribed to bog spavin, though the principal cause is hard work, consequently it



ENLARGEMENT.

Forming thoroughpin.



DIAGRAM.

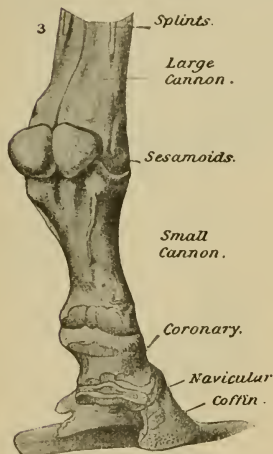
Showing dissection of thoroughpin and bog spavin; also the junction of the two affections.

is often seen in draft horses, hack horses, stage horses, and animals for general utility. It is also often seen on stallions that are used for serving mares, the strain thrown on the hind legs being very great. It is often seen in young growing colts when large and heavy for their age, owing to the immense weight brought upon young and tender joints.

How to know it.—Unsightly puffs are seen just in front of the point of the hock. They are soft and appear to be filled with air but it is synovial fluid that distends them. Thoroughpin usually accompanies bog spavin, but it may exist without the latter.



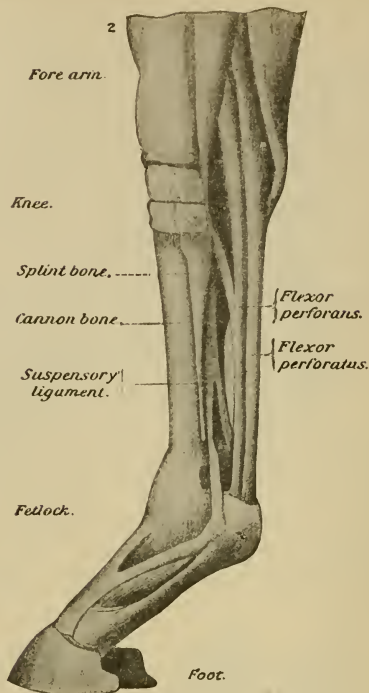
Ring Bone,
after Dadd.



Bones of the foot,
after Chauveau



Side Bones,
after Stonehenge.



Anatomy of the foot,
after Haubner.



Navicular Disease,
after Stonehenge.

What to do.—When first seen, apply a cooling lotion, made as follows :

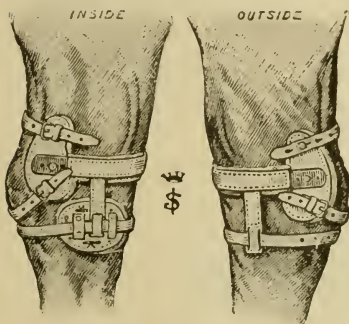
No. 12.	1 Ounce muriate of ammonia,
	1 Ounce saltpetre,
	1 Quart water,
	Mix.

Bathe the part with hot water, rub dry and apply the lotion three times a day, giving absolute rest. Follow this up for a week, then, after bathing with the hot water, apply the liniment No. 11, well rubbed in, twice a day. When the part gets sore from the liniment, hold up a few days and grease the part with lard till nearly healed, then repeat. It cannot be permanently cured, for, when made to absorb by the treatment and rest, it will return with work.

In case of a young colt getting thoroughpin, shorten his allowance of feed a little for a couple of months, and the puffs will become absorbed.

VI. Curb.

Curb is an enlargement on the back of the hock and a little below. It is seen in the form of a bowed section about four inches in length ; sometimes it is swollen up as thick as an inch from the healthy form, and sometimes the enlargement is so slight as to be hardly noticeable. When in the inflammatory stage the swellings cause lameness, but when once well hardened they seldom do. The seat of the injury lies in the calcaneo-cuboid ligament and others lying near it.



BRACE FOR SPAVIN.

That form of hock known as curby hock is most liable to it. The form that merits that name is curved from the foot to the stifle, extending backward outside of the perpendicular line

drawn straight from the posterior point of the hip to the ground. It is sometimes called sickle or cow hock. On account of the curved outline of the leg there is a greatly increased strain on the back of the leg at the point of the greatest curvature. This is found at the hock, hence we frequently have curbs on such legs.

Causes.—A sprain of the ligaments of the back part of the hock, frequently produced during severe exertions in jumping, running, trotting, pulling heavy loads, etc.

How to know it.—Standing at the side of the horse, opposite the hind parts, and looking across the legs you will notice a curve on the back and lower portion of the hock, instead of a straight line, as there ought to be

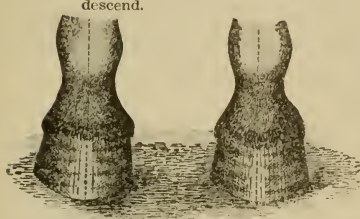


Weakness of ligaments of lower joints causing fetlocks to descend.

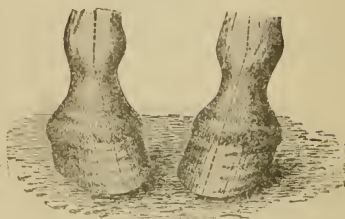
Bowed tendons.

Side bone.

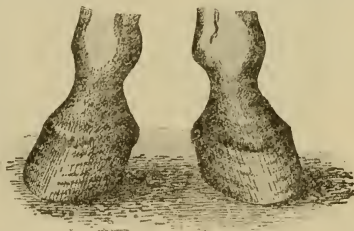
Ring bone.



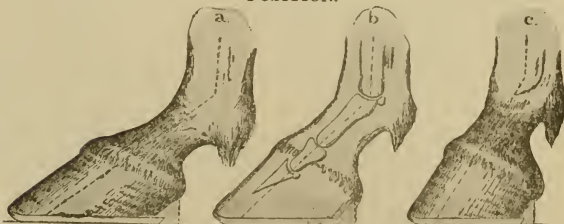
PAIR OF FORE FEET OF REGULAR FORM IN REGULAR STANDING POSITION.



PAIR OF FORE FEET OF BASE-NARROW FORM IN TOE-NARROW STANDING POSITION.



PAIR OF FORE FEET OF BASE-WIDE FORM IN TOE-WIDE STANDING POSITION.



FORMS OF HOOFS: a, side view of an acute-angled fore foot (shod); b, side view of a regular fore foot, showing the most desirable degree of obliquity (45°); c, side view of a stumpy, or "upright," fore foot; obliquity above 50° . In a, b, cc, note particularly the relation between the length of the shoe and the overhanging of the heels. Note also the toe roll of the shoes.

OBJECT LESSONS ON FEET.

in a healthy leg, from the point of the hock to the fetlock pad. In recent cases there is lameness, heat, soreness to the touch, and, like all sprains, it grows worse with exercise.

What to do.—In a recent case when the sprained tendons and ligaments are sore, swollen and hot, apply the cooling lotion, No. 12, bathing the part with hot water three or four times a day for half an hour at a time. Raise the heel an inch, continue this treatment till all soreness is gone, about a week or ten days, then apply the blister, Nos. 9 and 10, mixed. When the blister has taken well, grease it once a day for a few days till it is healed, then blister again. Give three or four weeks' rest. If this does not cure, or, if there is no improvement in two weeks, resort to the firing iron. Draw a line down the back of the leg, over the curb, and then draw lines obliquely to it in the form of a feather. The lines should be burnt about half way through the skin, but in no case burn clear through, for that would make a bad blemish. Rub the blister, No. 9, well in over the firing. Grease that the same as in the milder treatment, and wash it occasionally to remove scabs that may have pus underneath, which must be liberated. In old, chronic cases that have been neglected or have not yielded to other treatment, resort immediately to the firing iron, as recommended above.

Prevention.—Avoid breeding animals that have curby hocks, for they are very objectionable, and the form of the leg, in most cases, is transmitted.

VII. Ring Bone.

This is an exostosis (bony enlargement) on the pastern, around the upper or lower pastern joint. It usually runs clear around the leg in the form of a ring, hence its name. It usually forms around the upper pastern joint, but sometimes affects the lower one. In the latter case it is under the coronet, and is then worse, as it cannot be got at to be treated, and is more likely to cause permanent lameness from its extension to the navicular joint, involving it in the inflammation and ankylosis. When the ringbone comes under the coronet, it often grows so large and extends so much as to make a large, ugly, stiff, club-foot of the handsome, elastic pedal extremity of the horse, and gives rise to permanent lameness. But when it forms around the upper joint it does not usually grow very large, and is quite susceptible of treatment.

Sometimes the bony deposit is only in front or on one side, or on both sides and not in front, in either the upper or lower forms.

Causes.—A sprain, a blow on the bone from a kick, stumbling and striking it on a stone, stab from a fork tine, in fact, any severe injury setting up inflammation on or near the bone, is apt to result in a ringbone. For the nutritive material sent to the legs and feet is of a bony

character, that is, makes bone, so when an effusion is thrown out it becomes organized or forms part of the living system, and ossifies, the size of the deposit depending upon the extent of the inflammation. There is a theory among scientific men, that liability to throw out bony enlargements, especially around joints, is hereditary in the form of an *ossific diathesis*, which is borne out by actual experience in breeding; mares or stallions affected with spavin, ring-bone, splint, enlarged knees, etc., are apt to transmit them to the offspring. We frequently see foals two months old with ring-bones, and sometimes with spavins and curbs, making it very convenient for dealers to excuse their presence by saying the colt was foaled so, and that it never will hurt him. Which may be true enough in one sense, for the affected parts become solidly ankylosed, and as strong as any other part, and perhaps stronger, for the extra deposit acts as a support to the weak part; the part being naturally weak, inherited from one of the parents, the deposit is an effort of nature to strengthen it. Therefore, the practice of breeding from stallions or mares that are unsound from any bony deposit, except those caused by some known accident, is to be most emphatically condemned.

Showing Pastern and Pedal Bone of a horse affected with Severe Ring-bone.

1. The joint between the pastern bones, showing the groove in which the tendon of the extensor pedis muscle reposes.
2. The joint between the lower pastern bone and the bone of the foot.

of nature to strengthen it. Therefore, the practice of breeding from stallions or mares that are unsound from any bony deposit, except those caused by some known accident, is to be most emphatically condemned.

How to know it.—In the acute stage, (when it is beginning to grow) there will be lameness that works off with exercise; and also soreness, heat and swelling when examined carefully with the hand. When it has run on to the second stage, and become hardened into bone, it will be felt around the pastern joints in lumps, or in a ring running clear around the pastern. Or it may be spread over the surface of the bone as if plastered on.

Nature may effect a cure by ankylosing the joint, which will stop the lameness, but there will be a certain stiffness always; or ulceration of the heads of the bones may take place and cause permanent lameness. As long as it is in the stage in which the lameness works off with exercise, there is a chance of curing it by stiffening the joint. But when there is permanent lameness the chances of a cure are small, although it is best to try, and repeat the trial too.

What to do.—In the first stage apply hot baths, and follow them with the cooling lotion, No. 12, three or four times a day till all active inflammation is gone; then blister with Nos. 9 and 10, mixed. After the first blister has healed, repeat it. But when the ringbone will not yield to this treatment and goes on increasing in size, hardness and lameness or when it has reached the second stage without treatment, there is nothing so effectual as the actual cautery (firing iron.) It is applied in lines running up and down parallel with each



FOOT OF A HORSE.

Affected with ringbone. The pastern joints being entirely stiffened.

other, beginning at the corner of the pastern and extending around the front of it to the opposite side; but do not draw lines in the hollow of the pastern, as the flexion of the leg would keep the part eternally sore. Apply the blister, No. 9, immediately after firing. Remove the shoes and give absolute rest (no exercise at all) for four or five weeks; then turn to pasture for a couple of months. If the lameness is not cured, or shows no prospect of curing, in four or five weeks, repeat the operation, drawing the irons in the same lines made by the first applications. The lines may be made from the coronet to the lower edge of the fetlock joint, a distance of from two to four inches, according to the length of pastern.

A short pastern is more liable to ringbone from the greater amount of concussion it sustains through its lack of elasticity, which the long pastern has. The foot will always grow faster after the leg has been fired for ringbone, therefore the shoes will need to be reset oftener than on a healthy foot, and the hoof reduced.

VIII. Splint.

Splint is an enlargement on the cannon bone just below the knee, usually on the inside, but it is sometimes seen on the outside. Splints are quite common on the fore legs; in fact, nearly all horses that have seen



DIAGRAM.

Showing the different locations of splints. 1. High splint near the knee. 2. Low splint far below the knee. 3. Bony tumor, often miscalled a splint.



SPLINTS OF A SERIOUS KIND.

1. Splints involving the knee joint. 2. Splint interfering with the back tendons. 3. Small splint under the tendon of the extensor muscle.

much service have them, but they are occasionally seen on the hind legs. The usual seat of them is between the cannon and inner splint bones. Sometimes they attain to the size of a hen's egg, but usually are quite small. They generally cause some lameness when growing, but rarely do so after they become hard.

Causes.—Slipping, jumping, running, kicks, bruising the bone, etc., anything that may sprain the ligamentous attachment between the cannon and the splint bones. Sometimes the splint comes on the surface,

and then it does not cause much lameness, but when it comes under the periosteum (the covering of the bone) it is very painful. When splints come from bruises they may come on any part of the leg.

How to know it.—In the early stage there will be lameness of a peculiar kind, in that the horse will go sound on the walk and will trot lame.



DISHING ON THE
TROT.

Thought by some to indicate splints, but it is an erroneous idea; for as many dish the fore feet when trotting that have no splints, as there are that have them.

Upon examination a sore spot is found below the knee on the inside of the leg. By feeling of it, with the leg flexed, you can locate it immediately. In the later stages a bony lump will form on the leg, adhering directly to it. When the lump is an inch or more below the knee, it is no permanent detriment, but if it is closer to the knee than one inch, it is objectionable, as it is apt to interfere with the action of the knee. When it does affect the knee it usually causes permanent lameness.

What to do.—If noticed when the injury first occurs, apply either hot or cold water with the cooling lotion, No. 12, till the soreness is nearly gone and then apply the blister, Nos. 9 and 10 mixed. Give a couple of weeks' rest. Feed on light, soft food while idle. When the lameness and soreness to the touch are excessive, especially if the nodule is small, the trouble lies beneath the periosteum and requires the operation periosteotomy to split the covering of the bone to allow the exudate from the inflammation to escape, which will relieve the tension. It is done by cutting a small hole in the skin and pushing in a thin, long blade and cutting the periosteum over the lump. No change need be made in the shoeing.

IX. Sprain of Back Tendons of the Fore Legs.

Sprains of the back tendons are very common on account of the severe strain they are put to in all cases of unusual exertion. In such cases, a large amount of the effort is made by the fore legs, especially in racing, where the strain upon the fore legs in grabbing the earth and pulling the body exceeds that of the more powerful hind legs in pushing it, hence the frequency of these sprains. There are four ligaments and tendons in the leg below the knee, and the degree of injury to the horse in case of sprain, depends upon which tendon is most affected. That of the one nearest the bone being the worst, the next one to it being next, and so on to the last on the posterior surface, injury to that one being of least account.

Causes.—Sprains received during severe exertion in running, jumping, trotting fast, slipping on uneven ground, stepping on the edge of a hole

with the toe, letting the heel drop, and sometimes cuts or bruises by a blow across the back of the leg, overreaching, etc.

How to know it.—Severe lameness will be a prominent symptom, the more so the more important the tendon is in the leg. The suspensory ligaments lie next to the bone, and sprain of them can be felt on either side of the leg according to which branch (the inner or outer) is affected, for sometimes only one, especially the inner, is sprained. When it is the suspensory ligaments that are affected, the swelling will be upon each side near the bone, and not far from the fetlock joint. These ligaments are the main support of the leg, and when sprained, the lameness is far more severe than when any of the others are affected.

When the one next to the suspensory ligament is sprained, the swelling will be on the sides between the latter and the outside tendon. This tendon, next to the suspensory ligament, is called the perforans. The outside one is the perforatus, swelling of which is seen on the back of the leg, curved backwards like a bow. Sprain of the latter is of the least importance of any of them, as the damage done is slight, being easily cured, and not causing much lameness compared to sprain of the others.

Sprain of the metacarpal ligament is next in importance to that of the suspensory ligaments. They are often affected in common with the perforans. Swelling of it, the metacarpal, is found near the bone just below the knee, but usually extends to all parts immediately surrounding it.

There will be swelling, heat, pain and soreness; when the injured spot is touched the horse will rear sometimes in his effort to draw the leg from your grasp. In resting the leg he will thrust it forward and cock the fetlock, giving it the appearance of being swollen on the front part, and in walking he will not straighten the fetlock back to its natural position but will maintain it in the cocked position. If neglected and allowed to become chronic, the tendons contract and hold the fetlock in that position ever after.

What to do.—Remove the shoe and replace it with heels raised an inch, to take the strain off the back tendons; apply hot fomentations to the part as continuously as possible till nearly all the soreness is gone, wrap the leg in a woollen bandage and keep it wet and hot, applying the water



FLEXOR TENDONS OF FORE LEGS.

1. The perforans.
2. The perforatus.
- 3, 4. Accessory muscles.
- 5, 6. Restraining ligaments.
7. The pedal cartilage divided.
8. The navicular bone.

three or four times a day. Bathe the leg between times with the cooling lotion, No. 12, or make one as follows :

No. 13.	1 Pint strong vinegar,
	1 Handful common salt,
	1 Pint water,
	Mix.

Bandage as tight as the soreness of the leg will allow, with a dry cotton or linen bandage, immediately after applying the liniment. When the soreness is nearly gone apply the following liniment, well rubbed in after bathing with hot water, twice a day, and increase the tightness of the bandage from day to day :

No. 14.	1 Ounce tincture arnica,
	1 Ounce tincture opium,
	1 Ounce turpentine,
	1 Ounce alcohol,
	1 Ounce liquor ammonia,
	Water, to make one pint.
	Mix.

If the liniment irritates the skin much, suspend it for a few days and grease with fresh lard till healed, then repeat it. Give this treatment and rest for three or four weeks, then if there is a probable cure, turn the horse out for a run at grass ; if not, clip off the hair and blister well with No. 9. When the blister has taken, smear over it some fresh lard to keep the air from it and prevent pain. After two days it will need washing, and when dry grease it. Repeat this once a day till healed, and give a long rest. If all these means fail to effect a cure, or if the case is an old, long standing one the firing iron must be resorted to. Clip off the hair and fire in lines feathered as directed for curb. We would recommend in this, as well as in all similar cases, that the operation of firing be done by a qualified veterinary surgeon, for it is very easy to ruin a good horse by firing too deep ; it is an operation that requires experience and good judgment.

It will be found in most cases in which the suspensory ligaments are sprained, that the firing iron will have to be used, as they are very obstinate and will not yield to mild treatment. But in most cases in which it is the others that are affected the milder treatment will be effectual. To get the thickening out of the blistered leg, after the treatment is done, shower the leg with cold water two or three times a day, and also give it plenty of hard rubbing and bandage. Omit the high heels as soon as the soreness is gone from the tendons and before giving the treatment requiring the long rest.

X. Broken Down.

Causes.—Broken down is the term applied to rupture of the suspensory ligaments. It is most common among racers, because the strain their fore legs are put to in a race exceeds the strain of all other kinds of work. The force of the stroke comes on the fore legs. They grab the earth, pull the body forward, and when the body is passing the poise, and just before lifting the forward foot off the ground, they give a tremendous push that sends the body forward and at the same time high enough to avoid falling on the nose while gathering their feet for another spring. It is during the spring, just after the body has passed the poise, that breaking down takes place.

How to know it.—The ligaments are ruptured, the toe turns up and the fetlock pad comes down to the ground, completely ruining the animal.

What to do.—In cases of complete break down it is an act of mercy to destroy the animal. But horses are often so nearly broken down that they are ruined for all kinds of active labor, yet might be saved for breeding purposes by giving the leg thorough treatment, and a year's rest. The same treatment prescribed for sprain of the back tendons will apply to this, especially the firing, which is absolutely necessary.

Treatment for Blood Poison:—This is usually due to absorption of the putrefactive matter of gangrene or ulceration, or the pus of internal or large abscesses.

How to know it:—Fever, loss of appetite, langour, rapidly increasing weakness, emaciation, anæmia and palor.

What to do.—Take of quinine six drams, alcohol four ounces, glycerine four ounces, water to make one pint, mix, give two ounces every two to four hours. If recovery is not prompt call in a qualified veterinarian.

Treatment for Sallenders or Mallenders:—Mix a half teacupful of lard, one oz. of gum camphor and two dr. mercurial ointment and apply twice a day. If more serious, treat as for "grease."

CHAPTER VI.

LEGS OF THE HORSE, THEIR ACCIDENTS AND DISEASES---CONTINUED.

I. CAPULET OR CAPPED HOCK AND ELBOW.—II. FRACTURES.—III. OPEN JOINT.
—IV. BROKEN KNEES.—V. KNEE SPRUNG.—VI. COCKED ANKLES.—VII.
WINDGALLS.—VIII. SHOULDER LAMENESS AND SWENEY.—IX. CRAMP
OF THE MUSCLES OF THE THIGHS.

I. Capulet or Capped Hock and Elbow.

The elbows and points of the hocks are liable to injury, giving rise to swellings of the nature of tumors. They are filled with a watery exudate, slightly tinged with blood. If not emptied and properly treated they become caloused and organized into a solid fibrous mass in the course of a month or so. When this takes place, the callosity on the elbow becomes very heavy and hangs from the elbow, a very unsightly mass, sometimes as large as a child's head.

The callosity on the point of the hock never gets so large as on the elbow, but becomes just as hard and unsightly, and is more noticeable being farther from the body.

Causes.—Bruising is the only cause. It is usually long continued, hence the gradual development into a hard fibrous tumor. The one on the elbow is caused by laying the point of the elbow on the shoe or on the hard floor. Some horses have the habit of pawing the bedding all back before lying down, and letting the elbow come directly on the floor, while others always lie with the elbow on the shoe. Either way of lying, if continued for any length of time, will bruise these points and a watery exudation is formed, which fills the sack. If not evacuated it increases, and may suppurate and break, or it may become organized and solidify, the walls thicken and the whole become a solid mass.



CAPPED ELBOW, OR SHOE BOIL.

The one on the hock is usually caused by kicking either in the stall or harness. It is often seen on nervous, high-spirited horses that do not get

work enough, become restless in the stable and go to kicking to amuse and exercise themselves, and thus bruise the points of the hocks against the sides of the stall; if kept in a box stall, they are just as apt to do it. It is also often seen on draft horses that are worked to the cart; being hooked too near to the box, they strike it with their hocks every time their legs are raised. Sometimes it is caused by runaways or by pieces of timber falling on the hocks.

How to know it.—In case of the elbow a scurfy, wrinkled appearance indicates the danger, and if not attended to and the cause removed, it goes on growing day by day, till a large tumor is developed. Sometimes by a sudden shifting of the position of the feet in lying, a large, hard, hot swelling may spring up in one night; it may be only a couple of inches thick, but may be eight or ten in diameter, very sore to the touch; but when the tumor grows gradually it is not usually very sore.

When on the hocks, the points are found much swollen, hot, tender and sore to the touch. The trouble usually comes on suddenly with one or two nights' kicking.

What to do.—When hot, sore and of short duration, remove the cause; give a laxative of one and a half or two pints of raw linseed oil; foment the parts with hot water, with a handful of common salt in it, for an hour or so, then rub dry and rub gently in, the following liniment:

No. 15.

1½ Ounce tincture arnica,
1½ Ounce liquor ammonia,
1 Ounce tincture opium,
Water to make one pint,
Mix.

Repeat morning and night for two or three weeks, and if the case is a mild one, this treatment will cure it. In case it is the elbow and there is a soft fluctuating feeling, tap it with a knife and let the water out, making the opening large enough to pass your finger in. Syringe out the sack with warm water and follow it with No. 6. Repeat it twice a day, continuing the external treatment the same as before. After the oil has operated, give one of the following powders in the feed morning and night:

No. 16.

2 Ounces rosin,
2 Ounces saltpetre,
Powder and mix,
Divide into twelve powders.

It should be borne in mind that the cause must be removed absolutely, in order to have the treatment of any avail, otherwise it will all be lost, and the tumor will continue to grow in spite of all you can do. When he

lies on the floor, give more bedding; if on the shoe, apply a roller to the pastern, as large as your arm, so as to let it take the bearing on the arm instead of the elbow on the foot. If it is a very bad case, it will be well to keep the horse standing a few days. If it still remains large and hard, change the injection to the following:

No. 17.	1 Drachm iodine,
	1 Drachm iodide of potash,
	1 Ounce alcohol,
	1 Pint water,
	Mix.

Inject a little, twice a day, after using the hot water as before. When dry apply tincture of iodine twice a day, till it gets very sore, then grease it with fresh lard till healed, and repeat it.

If it becomes hard and solid, the only remedy lies in dissecting it out bodily. The operation is quite simple. Cut the opening in the skin in a line running up and down, then cut the cellular tissue around the tumor and dissect the whole lump out, being very careful not to cut into the elbow joint. If an artery or vein is cut so as to bleed a stream, take it up and tie it, sew the skin together, and dress it three times a day with the lotion, No. 6. If the stitches break out, and the wound gapes open, it is no use to resew it, but dress it three times a day with No. 7, and it will draw together as it heals. We would urge in this connection the employment of a qualified veterinary surgeon to perform operations in every case, as the use of the knife requires a thorough knowledge of the anatomy of the parts, as well as experience to avoid giving unnecessary pain to the animal.

Where it is the hock that is affected, the same treatment will suffice in all matters of detail until you come to puncturing the sack, when you must stop. Never cut into a capped hock except in a rare, exaggerated case, and then employ a veterinary surgeon to do it. Hand-rubbing will do a great deal towards making it absorb. As soon as the inflammation is well reduced, and all points working satisfactorily, the horse may as well be at work as idle.

Prevention.—Give the horse plenty of bedding; do not allow a faithful friend to sleep on the bare floor. Give plenty of exercise to avoid mischief in the stable, that may run on to bad habits and vices.

II. Fractures.

Causes.—Fractures of the limbs are very common among horses, not that the bones of horses are more brittle, but they are more exposed to accidents than those of any other animal, man not excepted. They are so active, quick-motioned, fleet and heavy, that when an accident occurs

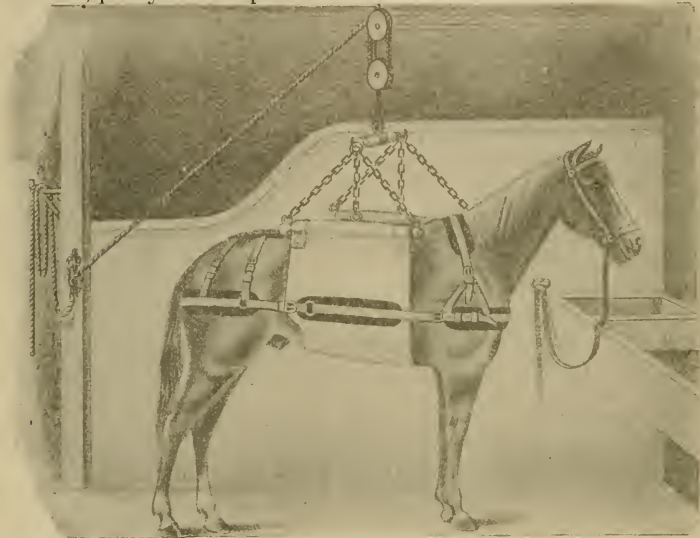
the effects are apt to be disastrous ; for, like a railway train, the unlucky animal does not have many chances to come out whole. All bones of the body are liable to fracture, but the bones of the legs are more so from being more exposed. In runaways, the animal often comes to a sudden stop by falling or colliding with some heavy, solid object. Then he is sure to suffer ; any one of the limbs may be broken, or it may be the ribs, back, neck, head, jaws, hips, etc. Kicks are very often the causes of fractures, especially of the legs—the cannons, thighs or arms being the bones which most frequently suffer. The bone of the foot is often broken by striking with great force against a stone, post, or any other solid object. The pastern is sometimes split through its entire length by jumping. The writer knew of a case of fracture of the cannon bone of one of the hind legs by catching the toe in the girth of the harness when kicking flies, breaking the bone short off.

Fractures are divided into the following classes : Simple—when nothing else is broken but the bone ; compound—when the ends of the bones punch through the flesh and skin ; complex—when the bone is shattered into many pieces, and one or more pieces may prick through ; transverse—when the bone breaks short off ; oblique—when the fracture is in an oblique direction across the bone ; green stick—when the bone breaks like a green stick, splitting and bending and twisting without breaking directly off. The bone may be only cracked, or broken without misplacement. The bones of old horses are more liable to fracture than those of young ones, becoming brittle with age.

How to know it.—When the fracture cannot be seen, but is suspected, manipulate it a little, listening attentively at the same time, and you will hear the grating of the ends of the bone together, which is an unmistakable symptom ; for grating or rubbing of rough ends together is never heard in health. Great lameness is inseparable from a fracture, be it ever so slight. When the bone is only cracked, there will be great lameness, with few if any conclusive symptoms to indicate fracture, but by careful examination a sore place can be felt ; the horse will not bear a pound on the limb, and will keep lifting it as if in great pain. In all cases there will be a rise in frequency of the pulse and respirations from the nervous shock and pain ; more or less inflammation follows, and the temperature will be raised a little. As the length of time increases after the fracture, if nothing is done to relieve it, all the symptoms increase, the nostrils dilate, the countenance becomes haggard, and expresses anxiety, the eyes become injected, the injured limb swells, becomes hot, and in all fatal cases, when the inflammation reaches its height, mortification begins and extends towards the body, when death is

only a question of a few hours. The part gets cold and clammy, a peculiar offensive sweat rises on the surface, the skin, if white, becomes purplish, but if black, the discoloration cannot be seen. As soon as mortification sets in the pain ceases.

What to do.—If it is a fracture of the cannon, arm, thigh, femur (the bone between the hip and stifle), shoulder or back, ninety-nine times out of a hundred the case is fatal if displacement takes place, and especially so if it is a compound or complex fracture. If it is a fracture of the back, paralysis of all parts behind the fracture will ensue. In any of



SLING IN USE.

the above instances, the horse may as well be destroyed, for it is utterly impossible to keep him quiet till the bones knit; they would repair as readily and as substantially as those of man, if we could put him to bed and keep him there six weeks. But take what measures you may, in most cases you will fail from no other reason than that he keeps moving about, swinging the leg, and behaving in a very restless manner generally, which prevents the ends of the bones from remaining in quiet contact long enough to grow together. The bones of dogs, sheep and sometimes cattle, grow together very readily because they are more quiet, and favor an injured leg more than a horse. If it is the shoulder or thigh, it is so deeply imbedded in muscle that it is very difficult to set the bones, especially if the fracture is oblique, for the muscles contract and draw the ends of the bones past their proper positions from two to six inches, and it is an utter impossibility to bring the ends together again even with the aid of pulley.

But if it is a fracture of the foot, pastern, fetlock, hip or any other part where there is no displacement, a cure can usually be made. After putting the horse in a roomy, comfortable, loose box, put him in slings to take the weight off the injured leg, and relieve the weight from the others. Make the broken limb as straight as possible, then envelop it for a distance of five or six inches in plaster of Paris, or if that is not handy, soak a piece of sole leather in water until quite soft, and mould it to the form of the leg, and bind it on so as to keep it perfectly tight and solid, and in its place. Splints may be put on outside of the leather. A starched bandage is very good in connection with the splints. Have the starch very stiff, fill the hair with it and then begin to wind, not tight but just enough so to keep the parts in their places; put on a considerable quantity of starch with each wind of the bandage; after making about half a dozen turns, put on the splints, one on each side, and one on the back, but none in front; then continue the bandage four or five turns. If the leg swells, so as to make the bandage too tight, slit the bandage up a little way at either end. Leave the whole thing on about five or six weeks, keeping the horse in the sling all the time, just tight enough to give gentle pressure on the belly and he will lie in it at his pleasure. If he acts unruly at first, quiet him by talking to him, and he will very soon get accustomed to the arrangement, and like it.

If any pieces of bone become detached they will act as foreign matter and must be removed. Any such complication in a leg already done up in a starched bandage, or in plaster, will be recognized by increased swelling in the surrounding parts, and also by heat and soreness, uneasiness and increase in temperature, pulse and respiration. The natural condition being: Pulse 36, respiration 10 to the minute, and temperature 98.5° F. The pulse is taken on the angle of the lower jaw, as the artery passes around the under side on its way to the face. Temperature is taken by a clinical thermometer inserted in the rectum, and allowed to remain in two minutes. Respiration is taken by counting the breaths, one in and one out making a respiration.

When the hip is broken down, making what is known as "hipped," there is nothing to do except to give time and what constitutional treatment is indicated. Fracture of the shoulder blade is treated in the same way, except that it might be advisable to put the horse in slings.

In all cases watch the symptoms and treat them as they require, but it would be well always to give the following mixture:—

No. 18.

1 Drachm tincture aconite root,
2 Ounces spirits of nitre,
2 Drachms fluid extract belladonna,
1 Ounce nitrate of potash,
1 Ounce carbonate of ammonia,
Water to make one pint.

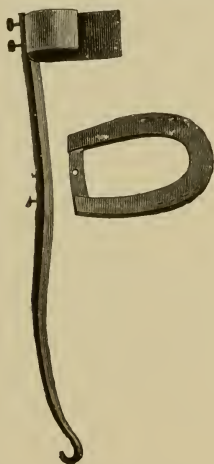
Mix.

Give one ounce (two tablespoonfuls) every two, four or six hours, according to the requirements of the case. This is the dose for a full sized adult horse, a young or small one in proportion. Continue this as long as there is any fever. Give all the cold water to drink the horse wishes. but give it little at a time and often. If the neck is broken, death ensues immediately, on account of the nervous communication to the heart, lungs and stomach being cut off, and so they stop working.

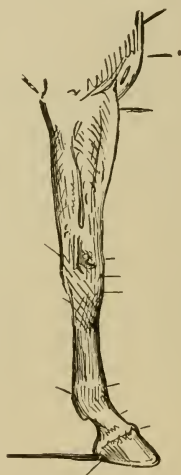
III. Open Joint.

Open joint is one of the most serious accidents that horse flesh is liable to, and unfortunately is quite common.

Causes.—Cuts, bruises, pricks from nails, pricks from the fork in handling the manure and bedding, falling on the road, kicks from other horses, etc., are common causes.



BAKER'S BRACE FOR BROKEN
KNEE WHEN THE JOINT IS
OPENED.



WHERE JOINT OIL IS.

The lines mark the points where synovia
(or joint oil) is interposed between the
different structures.

How to know it.—A wound, of course, is present, and a discharge also is seen when it is at all serious. The character of the discharge determines the extent of the injury; if it is an open joint, in addition to pus there will be a discharge of joint oil (synovia). Synovia is inodorous; has no smell; amber colored when fresh; whitish yellow when coagulated; thin and watery, but at the same time is of an oily nature when fresh; coagulates on exposure to the air. When the discharge

partakes of the character given above, especially in the latter particular, and is accompanied by more or less fever, good appetite, gradual wasting of muscular tissues, (though sometimes the wasting of tissue is rapid), tucked up appearance, hard unyielding swelling, with great soreness to the touch, and extreme lameness, there need be no doubt but that there is an open joint.

What to do.—If neglected and allowed to run its own course it will be fatal in almost every case; the horse will die from irritative fever, exhaustion and inanition. Sometimes it is fatal even with the best treatment, therefore it is of the utmost importance that remedies be promptly applied, and vigorously pursued.

When an open joint is recognized, wash the wound with tepid water with a few drops of carbolic acid in it; if the wound is deep, and there is pus mixed with the synovia, syringe it out gently, with the lotion, No. 6; generally, however, it is best not to syringe, probe nor push in the wound any more than is absolutely necessary; but let all the treatment tend towards filling up the wound with healthy granulations. As soon as the wound is nicely washed, make a paste of the following:

- | | |
|---------|------------------------------|
| No. 19. | 2 Drachms glycerine, |
| | 1 Drachm carbolic acid, |
| | Flour to make a thick paste. |

Make a plug of the paste and insert it into the wound; then smear solid extract of belladonna over all the hard swelling around the wound, and let a cold poultice made of oil-cake meal go on over the whole. Change the poultice and dress it twice a day. When the suppuration ceases, and there is a clear flow of synovia, omit the plug and let the poultice come directly in contact with the wound. Keep the horse as quiet as possible; carry food and water to him, so as to avoid the least motion. If it is practicable apply apparatus to stiffen the joint during the treatment. A convenient appliance will be described in the next article on broken knees.

The most difficult thing in the treatment of open joint is to stop the flow of synovia without checking the flow of pus. For whenever there is pus in a wound it must come out, or damage will be done; at the same time you cannot wash and syringe an open joint to get rid of the pus as you would an ordinary wound, because that would tend to keep the wound open and continue the flow of synovia; consequently there is an opportunity, usually, to display very fine judgment. Give, internally, tonics composed of:

- | | |
|---------|---------------------------------|
| No. 20. | 2 Ounces pure sulphate of iron, |
| | 2 Ounces chinchona bark, |
| | Powder and mix. |
| | Divide into twelve powders. |

Give one night and morning in the feed. Continue this till the wound is nearly well.

IV. Broken Knees.

Broken knee is a term used to designate contusion, abrasion and laceration of the soft parts—skin, ligaments and membranes—over the knee joints, but not the bones. It is quite common, especially where horse-back riding is fashionable, and fox hunting and steeple chasing are practiced. Sometimes the knees are only bruised or the skin broken, and then it is very simple and recovery is quick. But they are often broken right through into the joints, opening them completely and allowing a rapid flow of synovia. Sometimes they are easily cured, and at other times defy all treatment, and the joints become ruined and stiffened; and sometimes large spavins grow upon them. They sometimes prove



BROKEN KNEE.

Manner of probing the dirt sac of a broken knee.



COCKED ANKLE.
Result of corns and similar diseases.



BROKEN KNEE.

Manner of opening the dirt sac of a broken knee when it is found necessary to do so.

fatal by the excessive amount of irritative fever produced; the horse becomes very much emaciated, tucked up in the flanks, runs at the eyes, and weakness is great. Whenever the joints are opened, you have a very serious case at the best, and one that will tax the patience and judgment of the attendant.

Causes.—Knees are always broken by falling on them. The causes of falling may differ. Work horses drop upon their knees sometimes when starting very heavy loads, and if on stony or gravelly roads, are very apt to break their knees. Driving horses stumble and fall on their knees when they are sore in the feet, stiff in the legs or lame in the shoulders, and often open the joints. Saddle horses are the most liable to broken knees; if ridden slowly, on smooth roads, the weight on the back makes them more liable to stumble; if ridden across country they often come upon their knees on the other side of a fence or ditch.

How to know it.—There will be a contused, lacerated, ragged wound; the skin hanging in shreds, hair bruised off, the ends of tendons protruding and curling like bands of white tape. A discharge of synovia (an oily looking, amber colored liquid) takes place, and in bad cases the white glistening bones of the joint can be seen and felt.

What to do.—If the wound is dirty with sand, gravel or other substance, wash gently to remove it. If the ends of tendons or ligaments protrude, clip them off with scissors close down to the edge of the wound; draw the ends of the skin together and bind on a soft piece of old linen to keep the parts in place and the air from it, wetting the wound and linen with lotion No. 6. Then proceed to have the brace made as seen in the illustration on page 340, for it is absolutely necessary to keep the knee stiff and perfectly quiet, so as to get as small a secretion of synovia as possible. Splints are generally used, but they always irritate the leg where they come in contact, and fail in a great measure to prevent motion; but when Baker's brace is used, neither the knee nor any joint below it can be flexed a particle.

To make the brace, take a rod of good iron half an inch square, and of a length sufficient to reach from the ground to at least three inches above the knee; rivet a band two inches wide and six inches long on to the upper end of the bar, and bend it to fit the fleshy part of the arm; then bend the rod in its passage down the back of the leg to fit a healthy limb in its natural position when the weight is on it; make a three-quarter hook at the bottom, bending backward, to hook into the eye in the bar of the shoe, so that it can be inserted and removed at pleasure without removing the shoe. Insert two rivets or a staple at the top, and another set midway between the knee and fetlock, to receive the straps that bind the leg to the brace. Let the straps be an inch wide, and pad between them and the leg, especially over the shin. Pad the band well to prevent abrasion of the skin. The shoe may be an old one that fits the foot, with the heels carried out at least an inch beyond the heels of the foot, and turned upward a little; weld on across the heels of this shoe a bar three quarters of an inch wide, with an eye in the center to receive the hook. The shoe needs to be nailed on very strongly, or the horse will tear it off in his efforts to flex the leg, which he will try to do at first, but he will soon get accustomed to it, and walk around, lie down and get up the same as a man with a stiff leg. The strap at the top wants to be buckled tight enough to keep the brace in place, the one at the center of the cannon tight enough to keep the leg well straightened back in its natural position. The shorter brace is used in the same way in case the fetlock or pastern joint is opened; then it is not necessary to stiffen the knee.

When the brace is adjusted, remove the bandage and linen, and apply directly to the wound a soft, cold, oil-cake meal poultice, wet somewhat with the lotion, No. 6, after it has taken up all the water it will. When ready to be applied, sprinkle the poultice over with finely powdered charcoal. This will encourage and promote healthy, solid granulations and prevent much suppuration and sloughing. Some sloughing and suppuration will have to take place on account of the wound being contused instead of being made by a clean cut, as with a sharp knife. Dress the wound in this manner twice a day; continue it right along till the flow of synovia is stopped, even then it is better to leave the dressing on a few days more to further reduce the inflammation in the part. If the ends of the tendons protrude at any time they must be clipped off. If there is high fever give the following mixture:

No. 21.	1 Drachm tincture aconite root,
	1½ Ounce sweet spirits nitre,
	1½ Ounce nitrate of potash,
	Water to make one pint.
	Mix.

Give a tablespoonful every two hours, till the pulse is improved and fever abated. Feed lightly for a good while.

V. Knee Sprung.

Knee sprung is not a disease, but is the effect of disease. When the legs are healthy, the center of gravity passes down through the center of them, and out at the heels; but in case of knee sprung, the center of gravity passes back of the knees, giving them a very bowed appearance. It always comes on gradually, and may stop at any stage, and never get worse; but sometimes it goes on to so great an extent as to render the animal almost useless. Horses often sleep standing, and do it with safety, no danger of falling, as long as the legs are sound, but when the knees are so bowed forwards as to throw the center of gravity on a line forward of the origin of the suspensory ligaments the horse will fall when he goes to sleep standing.

Causes.—The most common cause is sprain or other injury of the back tendons of the leg. The ones most often sprained, and injury to which is most likely to cause knee sprung, are the suspensory ligaments, and the metatarsal ligament. Sprain of these, without proper treatment and rest, is sure to be followed by knee sprung. Sprains of the other ligaments, long continued soreness in the feet, sore shins, soreness in the joint, etc., are also frequent causes. In fact any abnormal condition of the foot or leg below the knee, that gives rise to long continued lameness and resting the heels or leg by knuckling the fetlock, is sure to be followed by a going over on the knees, from contraction of the back tendons

and ligaments, which hold the parts in that position ever after, unless relieved by the operation called tenotomy.

How to know it.—The legs of sound horses are straight from the elbow to the fetlock. Hence, any deviation from that position indicates something wrong. Stand opposite the shoulder of the horse, and notice the leg; any bending forward from the straight line at the knee creates suspicion. Any bad case, and many mild ones, are accompanied with thickening of the back tendons, indicating neglected sprains.

What to do.—There is nothing to be done, except in recent cases, which are rare. A case that has not been longer than two or three months in coming may be benefitted by clipping the hair from the back tendons, wherever there is any thickening or soreness, and showering with cold water several times a day for two or three days, and then applying blister, No. 9, well rubbed in. Remove the shoes, pare down the feet and open the heels. Tie his head up, so he cannot bite the blister, for thirty hours; then grease it once a day till nearly healed, and turn him out for a long run at grass. If he is not improved in a month, repeat the blister.

In old, chronic, incurable cases the operation called tenotomy, can be performed sometimes to very great advantage, but not as often as in case of cocked ankles, which form the subject of our next article. The operation will be therein described.

VI. Cocked Ankles.

The fetlocks are often knuckled forward, but this, like knee sprung, is only a symptom of some other trouble. The fetlocks are, however, often mistaken for the seat of the lameness, and are blistered and mutilated, of course without any benefit.

Causes.—Sprains of the suspensory ligaments, when low down around or below the fetlock joint; lameness in the bursa of the perforans tendon, as it passes over the fetlock; bruises on the heels; corns; quittor; navicular disease, or nail in the foot—anything that makes the horse rest the heels or lower and back part of the leg. Sometimes in bad cases of shoulder lameness, the leg is rested in such a manner as to let the back tendons contract so as to throw the fetlock forward.

How to know it.—It is recognized by the ankle joint being thrown forward like a knuckle; the heels raised slightly; the tendons contracted; and absence of any soreness or thickening in the joint itself.

What to do.—Spare no time nor pains to find the cause and remove it, and the effect will cease. Ninety-nine times in a hundred it is only symptomatic. In a great majority of cases the cause will be found in the feet; treat them, and the ankle will straighten up.

In long-standing cases the tendons become so contracted as to render a return to a natural position an impossibility ; in such cases tenotomy is sometimes practiced to advantage. A small opening is made in the skin about midway between the knee and fetlock ; a small blade is run in, edgeways, and through to the skin on the opposite side, but not through it ; then turn the edge up and cut off the tendons, stopping before the skin is cut above them, being careful not to injure the suspensory ligaments. If they are severed, the animal is useless and might as well be destroyed. To perform the operation, a knowledge of the anatomy of the parts is necessary ; hence it is advisable always, when possible, to employ a competent veterinary surgeon.

VII. Windgalls.

The tendons, as they pass down the back of the leg, are covered with a sheath moistened with synovia ; and where they pass over the fetlock



WINDGALLS.

Showing situation and forms of Windgalls.



CAPPED HOCK.



WINDGALLS.

As they appear upon dissection.

joint are synovial bursæ, to prevent friction ; there is also synovia between the tendons to prevent them from rubbing against each other. When, from hard work, the membranes secreting the synovia become irritated, they are excited to secrete more than their natural quantity, and the accumulation of it forms the soft, puffy swellings around the fetlocks, either fore or hind. They are always caused by work.

It is an old, popular idea that these swellings are filled with air, hence the name. They seldom cause lameness, except in the early stage, or in the very last stage, when they become ossified ; in the first stage the lameness soon passes off ; in the last it is permanent.

How to know it.—Soft, puffy swellings appear after considerable work, around the fetlock. They are usually the size of your thumb, but in some cases they grow to the size of a hen's egg.

What to do.—Make frequent applications of cold water, or cooling lotion, No. 12; and after a couple of days apply liniment, No. 11, well rubbed in, twice a day, and bandage tightly over it, till well blistered. Then omit the liniment but continue the bandage, with grease applied to the skin, giving the puffs all the direct pressure possible. Pieces of cork laid over the puffs, and bandaging over them is very effectual.

When the skin is sufficiently healed, repeat the liniment. Continue this treatment for three or four weeks, and then give the horse a run at grass or in a straw yard. This will be effectual if persevered with; but as soon as the horse is put to work again, either road or heavy draft, the windgalls will return.

VIII. Shoulder Lameness and Sweeny.

Shoulder lameness is common. Sweeny is rare, but it is often imagined and severely treated for, when the cause of lameness is very remote. Sweeny is wasting of the muscles of the shoulder blade, leaving the spine on the blade exposed the whole length, with hollows on each side that you could nearly lay your arm in.

Causes.—Shoulder lameness is usually caused by a sprain; it may be of the ligaments of the joint or of the muscles around the joint. Sprain of the latter is most common.

The sprain may be produced by slipping, falling, stepping on the heel of the fore shoe with the toe of the hind shoe, especially in the mud or snow, or catching the heel under a root or railroad track. Sweeny is usually caused by the shoulder being badly bruised by the collar in hauling heavy loads, or plowing, or by the horse falling and bruising the shoulder.

How to know it.—Lameness is a characteristic symptom; the shoulder and leg are carried forward all of a piece; no knee action; the shoulder carried forward and the leg swung; at the time the leg is being taken forward the head is nodded down at the start and suddenly jerked up toward the finish of the action. There is an inability to raise the leg to step over an obstacle a foot high, but he will drag the leg over. Swelling, heat and soreness are noticed.

In case of sweeny the muscles are wasted as described above, and much the same action of the leg will be noticed. In recent cases of either, the horse will rest the leg by flexing the knee and resting the foot on the toe without extending it. In mild cases, when he is able to travel, rest will seem to cure him and he will go out sound, but will go lame after a little, and get worse the farther he goes.

If allowed to run on without treatment, sprain of the shoulder, especially if it is of the joint, becomes chronic, extends to the bones, affecting the heads of them and causing permanent lameness.

What to do.—In all cases of shoulder lameness where there are heat, swelling, soreness to the touch and lameness, foment with hot water, never with cold, for half an hour at a time, three times a day. It is well to add a handful of common salt to a pail of the hot water. When it has dried after washing, rub well in the liniment, No. 14, morning and night. In most cases, if taken immediately and the above well applied, a cure will be effected, if rest is given, in from one to four weeks. If this fails to cure, a blister well rubbed in over the affected part will do good; use No. 9. In nine cases out of ten, when the lameness is in the shoulder, remedies applied to the joint of the shoulder will be effectual. A common mistake is made in applying blisters over the shoulder blade and withers, which only cause pain and often leave blemishes, without doing one particle of good, except necessitating a long rest; but it is better to have some other excuse for the rest.

When these means fail, the last resort is the seton. When well applied it produces counter irritation, that can hardly fail to cure unless there is porcelaneous deposit on the heads of the bones in the joint. When the exact source of lameness is located, pass the seton down over it just beneath the skin, letting it run always as nearly perpendicular as possible. Let it pass eight to fourteen inches under the skin, and leave the ends projecting three or four inches. The seton is best made of strong, coarse, unbleached muslin, torn into a strip, one inch and a half wide. Fasten leather buttons on each end to prevent it coming out. Smear it once or twice a week with a little fly blister to promote a discharge and increase the irritation. Foment and wash thoroughly clean with hot water morning and night. If the horse is inclined to bite and pull the seton, tie one end of a stick to his halter, and the other end to the surcingle to hold his head and neck straight. A needle made on purpose is needed to insert the seton; it should be fully a foot long.

The seton should be left in three weeks in mild cases, and four to six weeks in bad and chronic cases. Always give from one to three months' rest after removing the seton.

Sweeney is treated by mild blisters of flies in ointment as in No. 9, or in tincture, rubbed in gently, and repeated every fortnight for two or three months. The horse is better at grass while this treatment is being given. It will stimulate the muscles to re-develop. Gentle exercise is better than absolute rest.

IX. Cramp of the Muscles of the Thighs.

The muscles of the thighs are very subject to cramp in hard-worked horses, especially in old ones. These cramps are often diagnosed wrongly, are mistaken for dislocation of the stifle, are in fact rarely recognized except by an expert.

Causes.—Very severe exertion, especially if prolonged to any great extent; the muscles become fatigued, and the nerves in them exhausted; then if the horse is forced to continue working, cramp is very apt to take place. It is sometimes seen in cases where horses are being made to swim; cramps seize these muscles and render them for the time useless, being often the cause of drowning.

How to know it.—The horse is going along apparently all right, except that he is laboring from fatigue, when suddenly one or both thighs cramp and draw all into knots; a constriction will be seen in the hollow of the thigh; the point of the hock is drawn up, and the horse crouches with his hind parts; in fact he is drawn down and is utterly unable to move. On account of the position the hind legs assume, the trouble is often mistaken for dislocation of the stifle. When both legs are affected the horse often falls in the most intense agony, being unable to stand longer. When only one leg is affected it is usually drawn upwards and backwards; he is unable to extend it. If left alone, the cramps may pass off in the course of a few minutes, or they may last several hours.

What to do.—Get hot water as quickly as possible, and apply it, bathing the leg continuously till the muscles relax and the leg is let down, and the horse walks as well as ever. Then rub dry and rub well in liniment No. 15. In the absence of that high wines, tincture of camphor, arnica, hot vinegar, etc., are good. Give the patient a few days' rest.

Leakage from Navel:—If a portion of the naval cord remains immediately after birth, the tying of it carefully may be all that is needed. If this does not prove sufficient, apply Monsell's solution of iron with a feather three times per day. Allay inflammation by fomenting with hot water. Give internally one-fourth teaspoonful of Salol in a tablespoonful of castor oil and a little milk three times per day. When these remedies fail it will be necessary to pass a needle through the tissue back of the opening containing a strong silk thread and tie so as to include as little of the skin as possible. Apply tar water to keep flies away in summer.

Sometimes rheumatism accompanies or follows such condition of the colt. If so, see treatment for that under appropriate heading. Keep the colt quiet and warm. Give more nourishment as it grows better.

Navel Infection:—This is known by an inflamed or swollen condition of the parts and may be the result of weakness in the breeding, the colt falling an easy victim to filthy surroundings. Cleanliness and a prompt disinfecting and tying of the cord should head off any trouble in that line.

Wormy Corn Disease:—This ailment is designated in this way for want of a better heading. It usually comes on with the advent of a new crop of corn, the quality of which is inferior. The remedy is obvious: Feed sound grain. The unsound usually rises to the surface when thrown into water and may be skimmed off. For pasturing stalks see "Cornstalk Disease" in Cattle Department.

Engorgement:—This usually happens when the horse fills his stomach with grain, the swelling of which may cause death in a few hours. Give a purgative—No. 48—and follow with occasional doses of raw linseed oil. Exercise him constantly until free passages are obtained. Allow no water.

CHAPTER VII.

LEGS OF THE HORSE, THEIR ACCIDENTS AND DISEASES, CONTINUED.

I. STIFLED.—II. HIP LAMENESS AND HIPPED.—III. STOCKING.—IV. ELEPHANTIASIS OR LYMPHANGITIS.—V. SCRATCHES OR CRACKED HEEL.—VI. GREASE.—VII. MUD FEVER.—VIII. FURUNCULUS OR CARBUNCLE.—IX. DISLOCATIONS.—X. WOUNDS.—XI. SORE SHINS.—XII. OSTEOPHYTES, FOLLOWING SORE SHINS.—XIII. PORCELANEOUS DEPOSIT.—XIV. STRING HALT.—XV. INTERFERING.—XVI. OVERREACHING.—XVII. FORGING.—XVIII. RUPTURE OF MUSCLES.—XIX. ATROPHY OF THE MUSCLES.

I. Stifled.

The term “stifled” is usually applied to a horse suffering from any derangement of the stifle joint, but properly it is only applicable when there is dislocation of the pulley bone, (the patella). The patella is sometimes thrown out, but not as often as is generally supposed, and always on the outside, there being a ridge or flange of bone on the inside which prevents it going that way.

The ligaments of the stifle are often sprained, giving rise to lameness more or less severe.

Causes.—Dislocation is produced by a slip and a twist at the same time, the weight probably being upon that leg at the time; the animal recovers from the slip and finds himself with the leg as far back as it can be got, having carried the body forward on it, and when ready to bring the leg forward he is unable to move it. The leg remains protruding backward until help comes to relieve the awkward situation.

Sprains are caused in the same way, but to a less extent.

How to know it.—Dislocation is recognized by the position of the leg as described above, with inability to move it forward. The horse can be made to back, but he will swing himself back over the injured leg without raising it off the ground. The other legs are moved all right, but this one remains with the foot in one position as if riveted to the ground.

Lameness from sprains is recognized by a labored action in carrying the leg forward; the leg is carried farther forward than in health, and is swung outward, flexing the stifle as little as possible. When made to trot, all symptoms are exaggerated. Upon a careful examination with the hand there will be found a thickening around the ligaments and soreness upon pressure. When brought to a standstill he will rest the leg.

What to do.—In case of dislocation tie a rope to the pastern and pull it forward and a little outward at the same time, the man handling the rope standing about a yard from the horse's shoulder; then another man standing at the stifle shoves the bone back into its place, by pushing toward the horse's flank. It will slip in with a snap. Then put on a high-heeled shoe, the heels raised two inches, and bathe the stifle as continuously as possible with the cooling lotion, No. 12. When the inflammation that follows is gone, apply a blister all around the joint, use No. 9. Give a long rest. If this does not cure in four or five weeks, a seton may be put in over the joint, running up and down about four inches; wash it clean once or twice a day with hot water, and leave it in from two to four weeks. When entirely well, replace the shoe with an ordinary one.



DEVICE FOR A STIFLED HORSE.

Showing the manner of replacing the patella, in case the stifle is thrown out.

Treatment for sprains of the stifle is the same as prescribed for dislocation. Do not omit the high-heeled shoe, and give plenty of rest. If it is a mild case a strong liniment may be effectual; apply No. 14. The more heroic treatment may be applied when the mild fails.

II. Hip Lameness and Hipped.

Lameness and accidents are commonly found affecting the hips. The points of the hips often knock against door posts, trees, stakes and posts in the pasture; and also when falling the hip is often the first point to strike. At such times a point is often broken, or the whole hip is knocked down, giving a one-sided appearance to the hips, when they are known as hipped.

Causes.—Ordinary hip lameness is caused by spraining the ligaments or muscles around the joint. It may be done by slipping, falling, being kicked by other horses, etc.

How to know it.—Lameness in the hip is rather hard to diagnose on account of its usually being so deep-seated. A bad case of hip lameness



ELEPHANT LEG.

is known by a short step, about half the length of that of the sound leg, while the whole leg is carried together, all of a piece, and swung outward somewhat. When standing he will not always rest the leg, but may stand perfectly sound on it and only show lameness when moving, showing it entirely by labored action, the leg being brought forward slowly and with difficulty.

Manipulation will usually find soreness directly over or near the joint, and upon close examination, when standing behind and comparing the two sides, there will be found a slight swelling in the region of the injury. Sometimes the sprain is in the back part of the joint; then the labored action is seen more in backing, the horse going forward with little or no difficulty.

In case of fracture there will be a very perceptible deficiency or falling away in that region, accompanied by great lameness and soreness to the touch.

What to do.—In cases of fracture all that can be done is to make the horse as comfortable as possible and apply anodyne lotions and liniments, accompanied with hot applications, either water or vinegar, and the liniment, No. 15; and also give a long rest, from one to three months. The bones cannot be got at to be set; so all there is to be done is to let nature do the work. The animal will always remain one-sided, and will generally go a little one-sided, partly cornerwise, in the road; but he will be just as useful as ever for ordinary work.

Sprain of the hip is treated the same as any other sprain. Rest, hot water, and liniment, No. 14, well rubbed in, twice a day, will generally cure in from one to three weeks. But in bad cases a blister is often required; rub No. 9 well in over the affected part. If this fails to cure a seton is the last resort. Let it be a piece of strong unbleached muslin, an inch and a half wide and ten inches long. Run it upwards and downwards, about four inches, under the skin. Leave it in from three to six weeks. Keep the place running by applying a little fly blister to the string from time to time. Give absolute rest during this treatment, and when the seton is removed, turn the horse to pasture or straw yard for two or three months.

III. Stocking.

Stocking is the name given to swelling of the legs, usually confined to the parts below the knees and hocks, although in bad cases it extends above these joints.

Causes.—Weakness of the tissues of the legs, being unable to support the pressure above; weak, watery, impoverished condition of the blood, and the legs being the most dependant part, it settles on them. Standing still is a very common cause, so much so that there is a good deal of it just from standing from night till morning. It is most common in badly drained and illy ventilated stables; and young horses are more subject to it than older ones. It is often a symptom of some disease that requires attention; for stocking in disease is always a symptom of weakness which needs tonics and stimulants.

How to know it.—Swelling of the legs without other symptoms of disease; the swelling entirely disappearing with exercise, but returning when standing any length of time.

What to do.—Give the following tonic, one powder night and morning, in the feed:

No. 22.	1½ Ounce pure sulphate of iron,
	2 Ounces nitrate of potash,
	Powder and mix.
	Divide into twelve powders.

Shower the legs with cold water in hot weather, but omit the water in cold weather, give gentle exercise to reduce the swelling, and when coming in from exercise or work, bandage them tight; if in summer, use cotton bandages; in winter use flannel.

Avoid all strong, irritating or blistering applications. If necessary, repeat the powders. Remove the bandages when going out for exercise, and give the legs hand-rubbing.

IV. Elephantiasis or Lymphangitis.

This disease, sometimes called weed, is more particularly a blood disease, but being located entirely, by outward appearances, in the legs, we will consider it in this connection. It is usually seen in fat animals, rarely in poor ones. It is a species of surfeit and indicates a fat, plethoric condition of the system, more so than the excretory organs can take care of. It usually attacks one leg, and that a hind leg, though sometimes it is seen in both hind legs, and occasionally in the fore legs. It comes on suddenly after standing still a day or two or more. It often develops between Saturday night and Monday morning. The lymphatic glands of the leg become inflamed and unable to perform their functions, and the superfluous nutritive material is thrown back; the coats of

the lymphatic vessels become weak and the fluid oozes through them, infiltrates the cellular tissue and makes a leg something like that of an elephant.

Causes.—Too high feeding with too little work. When horses are worked every day it will seldom develop, but when a too highly fed horse is left in over Sunday, a rainy day, or from a nail in the foot, etc., the big leg will be found next morning.

How to know it.—An immense leg is seen on entering the stable. It is hot, painful, sore; if touched on the inside or the thigh the horse will raise the leg as high as possible, sometimes so high as to throw himself down. It is with the greatest difficulty that the leg is moved at all. There is a high fever, accelerated pulse, temperature raised, breathing increased in frequency, mouth hot, great thirst, and usually loss of appetite. It is as liable to happen in winter as in summer.



DISCOVERING THE ELEPHANT LEG.

What to do.—The treatment applied is with a view to depletion, to reduce the system to its proper condition in regard to the amount of fat it is capable of taking care of. So the first thing to be done is to give a ball of Barbadoes aloes:

No. 23.	5 Drachms Barbadoes aloes, 1 Drachm gentian, 1 Drachm ginger, Syrup or soap to mix.
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Make it into a ball the shape of your finger, and, grasping the tongue with your left hand, draw it down between the front teeth and pass the ball back onto the root of the tongue with the right hand, keeping the hand up against the roof of the mouth; do it fearlessly, for you cannot get hurt so long as you keep firm hold of the tongue with the left hand. The ball being safely down, put a teaspoonful of saltpetre into a gallon of water and give him to drink. Repeat this every three or four hours till the urine is increased in quantity and clearer in color; then continue it two or three times a day.

Bathe the leg with hot water with a handful of salt in it, for an hour or two, having the water as hot as a man can bear his hand in. Then bind the leg in woollen clothes to keep it thoroughly warm, let them reach clear to the body, and avoid all drafts. Restrict the diet to hay, water and bran mashes till he is able to go to work again. As soon as the soreness will allow of exercise, give him a walk of a couple of hours twice a day, increasing it from day to day. This may be kept up till all soreness and inflammation are gone, when he may go to work again; which will be before all the swelling is gone from the leg, but the exercise will help to reduce it. On coming in from work apply a wet bandage tight; and give plenty of hand-rubbing when going out. Bring the horse back to his feed gradually, and avoid overfeeding.

Prevention.—If a horse is working hard every day, and consuming large quantities of very nutritious, heating food, the regular allowance should be cut down one half when he is laid up for a single day or more. He should receive a large, wet bran mash for supper on Saturday night, no oats or corn at all, and only one-half, or two-thirds at most, of the regular allowance on Sunday. If this rule is followed no elephant legs will be found on Monday morning; but if the full allowance of strong grain is fed Saturday night and all day Sunday, the horse is liable to this and many other disorders.

V. Scratches or Cracked Heel.

Scratches or cracked heels are simply chaps and cracks around the heels and in the hollow of the pastern; they correspond to chapped hands in man. They are usually very simple, but sometimes are quite severe and require considerable perseverance to cure them.

Causes.—Exposure to cold mud, snow, slush and ice-water without proper care in fall, winter and spring. It is unknown in hot weather.

How to know it.—The skin is swollen in the hollow of the pastern; and around the heels, cracks and chaps extend in all directions; and larger cracks will run around the leg where it is the most flexed. When dry, they will be hot, sore to the touch, and painful. Sometimes the flexion in moving will cause the animal to raise the feet a couple of feet high at first, but with exercise the soreness partially disappears.

What to do.—When the horse comes in, wipe off the parts as nicely as possible, bandage them with flannel to keep them warm, and when dry clean them thoroughly with a brush, not touching them with water at all. Washing with warm water would do no harm if they were well dried afterward, but to be on the safe side it is better



CRACKED HEEL.

not to wash them at all. When clean, apply casmoline, petrolina, arnica jelly, carbolic salve, or an ointment made of lard and pounded alum in equal parts. Any of these may be applied, both when coming in and when going out. If they get very bad, give him a few days rest. If proud flesh springs up in the cracks, burn it down with burnt alum. If necessary to rest the horse for them, give him a teaspoonful of saltpetre in the feed morning and night for three or four days.

Prevention.—Never wash the feet and legs in cold or wet weather, say after November 1st, till April. It is good for them to be washed in warm weather; it softens the dry, hard hoofs, and cools off the horse when heated; but it is objectionable in cold weather. When coming in from cold slush and mud, dry and clean the feet and legs thoroughly.

VI. Grease.

Grease is the name given to a disease of the lower parts of the legs that seems to be aggravated scratches, but it is entirely distinct from



FIRST SYMPTOM OF GREASE.

Scratching one leg with the other foot.



FIRST STAGE OF CONFIRMED GREASE.

EXUDATION.

scratches. Scratches lies in the upper or cuticular layer of the skin, and grease is inflammation of the deeper layers. It is so called from the nature of the discharge, which is profuse, and greasy in appearance. It has a very offensive odor.

Causes.—Neglected scratches often runs into grease, but there must be other conditions favorable—impure blood, tendency to surfeit, hide-bound and general bad condition. It is just as likely to appear in warm weather, when it is the result of surfeit, as it is to appear in cold weather, when it results from neglected scratches.

How to know it.—The legs are swollen to the knees and hocks, and an offensive, greasy matter is oozing from the pores. When bad they are so sore as to cause considerable lameness. The discharge comes as much, and often more, from above the fetlocks as from below, and

mostly from the long thick hair on the back of the legs. Draft horses are most subject to it. Itching of the part is an early symptom. When grease is neglected, proud flesh sprouts up through the openings made by the pus, and after a while they become caloused and horny, and then they are called grapes. At this stage of the disease the swelling of the leg has become chronic, and can never be reduced.

What to do.—Give the horse a purgative of aloes, No. 23. Feed on bran mashes a few days. When the purging has stopped give a teaspoonful of saltpetre in the feed morning and night for three or four days. Apply hot poultices, with powdered charcoal sprinkled over the top, to the



SECOND STAGE OF CONFIRMED GREASE
CRACKS.



GRAPES.
The stage of Grease in which horny lumps
are seen, called Grapes.

legs, changing them once a day; continue them till the active inflammation is nearly all gone, then leave them off and apply lotion

- No. 24. 1 Ounce sugar of lead,
 1 Pint water,
 Mix.

Apply three times a day. Wash the parts often enough to keep them clean and poultice them occasionally to keep the inflammation out. While using the lead lotion, give a tablespoonful of epsom salts in the feed once a day. If proud flesh springs up burn it down with burnt alum.

When the disease is cured, if there is any thickening remaining in the legs, work, hand-rubbing and bandaging will remove it.

VII. Mud Fever.

This is fever in the skin of the legs, from the feet to the knees and hocks. The skin is covered with scabs as if it had been blistered, and when they come off the hair usually comes with it, leaving the legs bare.

Causes.—Chilling of the skin by standing or working in cold mud and ice-water. The skin becomes thoroughly chilled, almost like frost-bitten, and when warmed the reaction is so great as to produce much

fever which leads on to the conditions spoken of above, and sometimes to furuncle and carbuncle. It is most common on limestone roads, the soil being irritating.

How to know it.—Swelling of the legs is seen. After being exposed for a day or more to cold, wet mud, or ice-water, they will be found to be very hot and sore next morning. After a few days the hair will be filled with scabs that cling tightly to the skin, but after a few days more they will loosen and come off, bringing the hair with them, leaving the legs entirely bare sometimes. There is usually more or less systemic fever with rheumatic tendencies.

What to do.—If bad, leave the horse in for a few days, wash the legs with warm water and bathe them afterwards with lotion, No. 24. Repeat this two or three times a day. When the swelling begins to go out of them and the skin gets scaly, grease them with fresh lard once a day well rubbed in. Give internally two tablespoonfulls of Glauber's salt three times a day for a few days and follow that with No. 22.

Mud fever often runs into furunculus which will next be described.

VIII. Furunculus or Carbuncle.

Furunculus is the name applied by Prof. McEachran to what is called by many mud fever in an aggravated form, when it takes the form of carbuncle. It attacks the legs, but usually is confined to the coronary region and pastern. It acts a good deal like a bad boil, swells very large, gets very hard and is awfully painful, so much so that when it comes under the coronary band or on the front of the pastern it is often fatal, especially on the hind foot.

Causes.—All the causes that belong to mud fever are applicable to furuncle, and, in addition, an unhealthy condition of the blood which always has a tendency to aggravate any malady.

How to know it.—Extreme lameness is usually the first symptom noticed; a reluctance to put the weight on the foot; a continual raising of the foot, indicating great pain; the horse does not lie down; great fever in the system; mouth hot; eyes red; nostrils dilated and more or less blowing; swelling of the coronet in the region of the carbuncle, unless it is situated an inch or more above the coronet. When this has run on for twenty-four hours the skin breaks in rags and in the course of the next ten hours it sloughs off and a core goes with it varying in size from a cherry to that of a man's thumb. Sometimes the skin sloughs off from a surface as large as the palm of a man's hand. When these cases are fatal the horse dies from irritative fever and exhaustion from pain. The appetite is not always affected, the pain being so great a drain on the system that the horse will often eat more than usual; but in all cases he loses flesh fast and becomes thin and tucked up in a very few days.

What to do.—When first noticed, give a ball of purgative medicine made up as directed in recipe No. 23, regulating the quantity of the aloes by the size of the horse; give from three to five drachms. Then give tincture of aconite root in ten-drop doses every two hours till the purgative begins to work; then stop. Apply a linseed poultice, hot and soft, to the inflamed part. Change it twice a day till the sloughing takes place; then wash it with a weak solution of carbolic acid—one part of carbolic acid to forty parts of water—and renew the poultice; dress it in this way till the sore begins to granulate nicely, then omit the poultice, and dress three times a day with lotion No. 7, washing it often enough to keep it clean.

If the swelling comes directly under the coronet the tension will be immense, on account of the little elasticity in it; the soft parts underneath cannot swell, and therefore the pain will be unbearable unless it be cut. So we would recommend in such cases to sever the coronet by passing a probe-pointed knife in under it and cutting outwards. If it bleeds profusely, which it is likely to do, tie it up loosely for a while with a cotton bandage. Subsequent treatment will be the same as given above. Feed liberally all the time. The healing of the wound will appear to be slow, but patience is required, as the skin will not form over the surface all at once, but must grow over from the edges. If lotion No. 7 is well applied there will be no proud flesh nor other hindrance to the healing process.

IX. Dislocations.

Dislocations are very rare in the horse, except that of the stifle, which is described in the article under that head. The shoulder and hip joints are imbedded so deeply in muscle, and the sockets of the joints are so well guarded by the cartilage that surrounds them that dislocation of those parts is seldom met with. The bones, femur and humerus, fracture through their necks before their heads give way from their sockets. The elbow, knee, hock, fetlock, pastern and coffin joints are all so well guarded by flanges, central ridges, depressions, width of joints, etc., that fractures almost invariably take place before dislocations. In order for a dislocation to occur, many of the strong ligaments that surround and hold their joints together would have to be ruptured and torn from their attachments, which would be nearly if not quite as serious as a fracture, and in most cases, except that of the stifle, destruction of the horse would be the cheapest treatment; for a great length of time would be required to effect a cure, and the result would be very unsatisfactory.

But in case of a valuable stallion or mare, that might be used for breeding it would be well to give them a chance, by putting them in the

slings and using hot fomentations, and careful bandaging to support the injured joint, at the same time giving internally, mixture No. 21, to keep down any fever that might arise from the injury to the synovial membrane. And after bathing with hot water, which ought to be done three or four times a day, the following liniment may be used, and bandage right over it, applying the bandage middling tight:—

25. 1 Ounce tincture arnica,
 1 Ounce laudanum,
 Water to make one pint,
 Mix.

X. Wounds.

What to do.—Wounds are common, and in most cases have to be treated, at least for the first dressing, at home by those who happen to be upon the premises, owing to the urgency of the situation. Bleeding is often profuse to a dangerous degree, and when stitches are required it is always desirable to insert them while the wound is fresh. For the stitching is not only much more painful and less successful when postponed, but after a few hours, when swelling and suppuration have begun, it is useless, for the edges will not unite and the stitches will certainly tear out, adding to the soreness and blemishing that follows. Hence it is very important for some one about the place to act as surgeon, at least for the time being.

When the skin and flesh are laid open by kicks, calks, cuts, collisions, etc., the first thing to do is to stop the bleeding. Arterial blood is bright scarlet, venous blood is dark blue. When an artery is cut apply the compress above the wound, towards the heart, to intercept the blood as it is coming down. If it is a vein that is cut apply the compress below the wound, for the veins conduct the blood towards the heart. The compress may be a cork bound on the artery or vein, or a wad of cloth, or a piece of dry sponge with a bandage wound over it pretty tight. If the wound is in a position that will not admit of bandaging and there are arteries or veins cut, so as to be dangerous, they must be caught up and tied. In the absence of proper instruments an artery can be taken up with a fine pair of nippers and the end tied with a piece of silk. But in many cases it is unnecessary to tie the artery, since the bleeding may be stopped by filling the cut with scrapings from the flesh side of sole leather, cob-webs, oakum, tow, lint, etc., or a solution of copperas, or the tincture of iron may be thrown into the wound.

If no bleeding is taking place, proceed at once to sew up the wound. Use a needle that is strong and not liable to break while being pushed

through the skin, and silk thread, doubled to prevent its tearing out. Make the stitches about three-fourths of an inch apart and tie each one before taking another. Clip off the hair from the edges of the wound so that none will be doubled under, and bathe it with the carbolic lotion, No. 6.

If the wound is on the leg it is best to draw the skin together with a few stitches, even though they are certain to tear out, and, after dressing with the lotion, apply a bandage smoothly over the wound just tight enough to hold the parts in place. Then let it alone till it begins to suppurate, when it needs washing with warm water and castile soap to clean it, and dress as before with lotion and bandage. When the stitches burst, cut them out.



STITCHING WITH A FIXED
SETON NEEDLE.

When the wound is filled up with flesh even with the surface, change the lotion to No. 7, and leave off the bandage. If the wound is on the body and cannot be bandaged use lotion No. 6, till the flesh has made considerable headway towards filling up the hole and then change to No. 7.

If the bone is affected and caries (ulceration) begins, dress it twice a day with lotion:

No. 26.

$\frac{1}{2}$ Ounce hydrochloric acid,
1 Pint water,
Mix.

Apply it with a swab directly to the caried spot. The flesh in such a case may be dressed with the other lotions the same as above.

If the joint is affected, treatment for it particularly will be found under the head of Open Joint.

If the tendons are cut off so as to let the fetlock down to the ground and the toe turns up, it is very serious indeed. Put the horse in slings and keep him there until the wound is healed and strong. It will take two months or so. Cut off with a pair of sharp scissiors any tendon that protrudes, support the leg in its natural position so that the ends of the cut tendons meet, draw the skin together, bandage and treat as above. Put on a high heeled shoe to relieve the strain and if there is weakness after healing apply No. 14 until mildly blistered an grease with fresh lard. If but one tendon is cut, apply the same treatment.

XI. Sore Shins.

Young racers are very apt to have sore shins from too much galloping before the bones become thoroughly hardened. The bones all along the from the foot to the knee, become quite sore, somewhat enlarged

and cause lameness. The consequences of sore shins are quite serious as they often render the colt unable to go on with his training. The inflammation is often followed by an ossification of the effusion that is thrown out and gives the leg the appearance of having patches of bone plastered over the shins under the skin.

Causes.—Too much galloping when the bones are soft and young, and the soreness is often aggravated by too much rubbing when coming in from exercise. The bones should never be rubbed hard nor very much, but the tendons on the back of the legs may have all the rubbing they can get. Sore spots on the legs are often produced by bruises, kicks from the toes of stable boys' boots, kicks from other horses, etc. These last named causes are often followed by bony enlargements on any part of the legs, or the enlargements may come directly on a joint, when very serious results may follow.

How to know it.—Soreness forward, shown by a short, stiff, stilted gait; if more in one leg than the other there will be lameness. There is soreness to the touch, more or less swelling all over the surface of the shin bones, or at any point of injury when it is the result of accident. The swelling is soft at first and spongy, but in a few days becomes quite hard and has the feeling of bone. The soreness may extend over the whole surface, or it may be confined to that part near the joints, especially the fetlock and pastern. The animal is inclined to knuckle at the fetlock, and go over on the knees.

What to do. Give absolute rest; remove the shoes; foment the legs with hot water for half an hour at a time three times a day, and follow the hot water each time with the lotion, No. 12, and bandage loosely, wetting the bandages and legs with lotion No. 27, as follows:

No. 27.	1 Ounce tincture arnica,
	1 Ounce tincture opium,
	Water to make one pint,
	Mix.

Continue this treatment till all soreness is gone, then, if necessary, apply a little of the blister, No. 10, rubbed in once a day till pretty well blistered, then grease once a day till healed, and repeat.

In mild cases, where the first symptoms are shown, frequent bathing, say three times a day, with lotion No. 27, and loose bandaging, will prevent its full development, especially if rest is given. In bad cases the rest needs to be prolonged to several months. The same rules and recipes will apply when enlargements come on the bones from kicks and other bruises. The firing iron may be drawn over the spot when near or on a joint, if other and milder measures fail.

XII. Osteophytes, Following Sore Shins.

This is the name given to the bony deposits that follow sore shins. There are several different kinds. The velvety, or villous resembling hoar frost, is usually spread all over the bone in a uniform layer, and is seen on bones of young racers, hack horses and sometimes driving horses. The splintered or laminated kind grows more in excrescences and splintered as in spavin. The warty or stalactite kind grows like a wart with either a pedicle or stem on a narrow base, or may-be a small surface on a large base, or a large excrescence spread on the bone over considerable surface; these are seen on any bone as results of bruises, etc., and sometimes appear around the hock and knee joints. Many other forms may be seen, like tarry matter poured over the bone hot, and hardened while cooling, etc.

Causes.—Hard work of any kind making the bones sore, inflammation sets in and then deposits follow as a natural result. Accidents, bruises, kicks, etc., contribute their share.

How to know it.—The bony enlargement can be seen and felt. In addition to that there will, in all probability, be more or less lameness. In the absence of lameness there will be a stiff, short, stilted gait; more or less knuckling of the fetlocks and going over on the knees—knee-sprung. It is most often seen in hack horses, saddle and buggy horses that get much work.

What to do.—Treatment is unsatisfactory in that it requires a long time, continuous rest and considerable attention, and after all, the horse is not much improved; but it is always best to give it a trial, especially in young and valuable horses. In the early stages the same treatment prescribed for sore shins is applicable, which see; and in the later stages repeated applications of the blister No. 10, and a long rest will help him some, if it is an old, chronic case; and if it is a recent case, it will cure.

XIII. Porcelaneous Deposit.

Causes.—Often in bad cases of spavin and ringbone, and in many other joints of the body, an ulceration of the head of the bone takes place in the joint, the cartilage becomes absorbed and lets the ends of the bones together, and as a result of friction, a bony deposit is made on the ends coming together which gets rubbed and chafed till it is polished as smooth, hard and glossy as porcelain, hence the name.

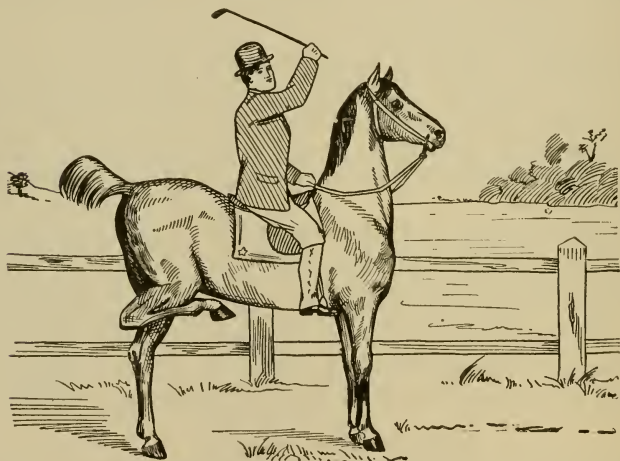
How to know it.—By negative symptoms rather than positive. The horse is always evenly lame; the lameness does not work off with exercise; no treatment does any good, and the true nature of the trouble can only be determined by a post mortem examination.

What to do.—Give the affected joint the treatment prescribed under its proper head, exhaust all known remedies, and when you utterly fail to produce a cure, you may come to the conclusion that there is porcelainous deposit in the joint which is incurable. No treatment is of any avail.

XIV. String Halt.

Causes.—String halt or spring halt is a purely nervous affection in which the cause cannot be definitely located, but which may be due to any local disorder. It often exists without any visible lesion.

How to know it.—The leg is jerked up towards the body with every step, sometimes so strongly as to strike the belly with the fetlock. Sometimes it is very slight, only showing in moving from side to side in the stall, or only when starting forward or backward. Sometimes both legs



A BAD CASE OF STRING HALT.

are affected. It is usually worse when starting; sometimes it is so bad that the horse has hard work to start at all and will stand and jerk up first one leg, then the other; but once started he goes without hesitation. But it is very fatiguing and wearing; and the horse seldom accumulates any flesh.

What to do.—The treatment is very unsatisfactory, seldom or never resulting in any benefit, but it is best always to treat any local disorder of that region as it requires, with a hope that it will alleviate the nervous jerk.

XV. Interfering.

Interfering is the effect of a variety of causes that make the horse brush the foot that is going forward against the other leg. It may be either fore or hind. He may brush any part of the leg according to the height to which he raises the foot, sometimes the knee or above it, the shin or the coronet, but usually the fetlock.

The fetlock is brushed when the horse is walking or on a dog trot; the coronet, on the walk with very low action; the shin, on the trot when the feet are raised higher than when the fetlock is brushed; the knee, on the trot with very high knee action; above the knee, when there is excessively high action.

The effects of interfering are always bad, but particularly so when it is the knee that is injured. Interfering is usually confined to brushing the foot against the leg, but sometimes the foot is brought against the leg in such a manner as to strike it, causing the horse to go off on three legs for a few steps, and doing great injury by bruising the part. This is sometimes done by horses that do not brush habitually, but from some misstep the foot is brought forward with a swing and strikes the other leg in its passage.

Causes.—Colts, before being shod, seldom or never interfere, but often do it as soon as shod, while in other cases the fault does not appear until some bungling shoeing is done. The shoeing is a common cause; the foot is often pared down too much on the inner side, tipping the fetlock in so as to bring it in the way of the other foot; the shoe is sometimes left too full on the inner side, projecting out so far as to brush in passing; being shod too heavy or too light often causes it. Colts interfering when shod first, is due to the increased weight of the feet, but when the muscles become accustomed to carrying the shoes it disappears. Malformation is a common cause; the fetlocks are sometimes tipped in; the toes turned in or out giving a swinging motion to the fore feet. Weakness is a common cause, and also thinness in flesh.

How to know it.—There is often lameness from it without any visible marks on either leg or foot; in such a case chalk the foot, or smear lamp-black on it and move the horse and it will be demonstrated. But the point struck is usually very plain, also a polished surface on the foot, and sometimes blood on the hoof.

What to do.—The first thing to be done, always, is to apply a boot to the place on the leg that is brushed. Nicely-fitting boots for all parts of the leg are made of both cloth and leather, that protect the part from injury; this done, proceed to remove the cause. If it is in the shoeing



ENLARGED
KNEE, FROM
SPEEDY CUT.

take the horse to a shoer who is an artist in the business, and by close examination ascertain what changes can be made. As a rule no two feet are alike, and it requires an artist and a mechanic to change the position of the feet and legs relatively. A good rule to follow in all ordinary cases is to shoe so as to tip the fetlocks out, giving the feet room to pass by without brushing. This is done by leaving the inner side strong and paring down the outer side, which will throw the centre of gravity in a new line and often prove successful. Instead of leaving the inner side of the shoe full make it rather scant. If the shoes are too heavy, lighten them; if too light, or too large, change them. If the horse is overworked,

thin and weak, give him a rest and a little better feeding. There is no plan much more effectual than to spread the legs with good solid flesh, making them travel wider.

If the knee gets larger and the swelling fills with liquid, tap it carefully and let the liquid out. Other points are not likely to be bruised badly enough to cause an effusion. After the cause is removed foment with either hot or cold water and apply lotion, No. 12; repeat it three or four times a day. Gentle exercise may be given if the swelling is not too large and sore. When below the knee bandages may be used to advantage. When the swellings become hard and calloused the liniment, No. 11, may be rubbed in twice a day after a hot bath,



A GOOD FORM.

Rear view of a horse showing how full thighs spread the legs and prevent interfering.

rubbing the part dry before applying the liniment.



ANKLE BOOTS IN COMMON USE.

The cuts above illustrate the application of a few of the most common forms of boots, used to prevent injury by interfering.

It should be remembered that there is no chance of reducing the enlargement until the cause is removed. A boot should be worn till the tendency to interfere is obviated.

XVI. Overreaching.

Causes.—Overreaching is catching the toe of the hind foot on the heels, quarters and shoe of the fore foot, often cutting the quarters badly, injuring the hoof and causing it to grow down from the wounded part, giving rise to quarter cracks, weak quarters and rough, horny patches over the heels and pasterns.

What to do.—This is a fault that has to be overcome by proper shoeing. Usually, shoeing quite heavy forward and very light behind will make the horse take up the fore foot quicker, and get it out of the way of the hind foot before the latter strikes it. But in trotting horses, this is insufficient; for, when trotting fast the hind foot passes by the fore foot on the outside to get an extra long reach; but they often fail to do it nicely and cut their quarters badly. This is usually overcome by weighting the hind foot on the outer side of the toe, cornewise, as it were, to the foot; this will have a tendency to throw the foot outward and forward at the same time.

But in slow-going horses this is impracticable, and dependence must be placed on shoeing. The heels of the fore shoe need to be very short, the toe of the hind shoe set well back under the hoof, and the toe calk, if any, set well back on the web of the shoe; but in such cases, if the work of the horse will allow, it is best not to have any toe calk at all—let the shoe be plain. While trying different plans to overcome the habit, apply quarter and heel boots to the fore feet to avoid ruining them.

XVII. Forging.

Forging is the habit of clacking the hind and fore shoes together when trotting. It is not productive of any harm other than wearing off the toe of the hind foot; but it is very disagreeable and annoying to the driver, and fatiguing to the horse.

Causes.—The position of the feet at the time of the clack is different from what it is popularly supposed to be. The prevailing impression is, that the toe of the hind shoe comes in contact with the heel of the fore shoe, but that is a mistake. As the fore foot is being raised off the ground, with the heel already raised and the foot in the act of rolling on the toe, the toe of the hind foot comes flying in under the heel of the fore, and the two shoes come together, the toe of the hind against the web of the fore, making the clacking noise. It often wears off the toe of the hind foot badly.

What to do.—The object to be gained is to increase the action and activity of the fore leg, to get the foot out of the way of the hind foot. Shoe light behind and heavy forward. Let the weight of the fore shoe be mostly on each side, and the web at the toe as narrow as possible, setting the toe calk, if any, as far forward as you can. Set the hind shoe back from the toe a quarter to half an inch, and the toe calk as far back on the web as possible, and very small. Leave the toe of the hoof projecting over the shoe.

XVIII. Rupture of Muscles.

Causes.—The muscles are sometimes ruptured across the fibres by over exertion, severe sprains, etc.

How to know it.—Great lameness is apparent as an early symptom. Swelling, heat, soreness and pain are noticed in the course of from two to six hours after the accident. There will be unwillingness, amounting almost to inability, to move. When the inflammation has entirely subsided and the swelling is all gone, there will be a depression in the muscle at the seat of the injury from absorption of the injured portion.

What to do.—During the active inflammation, foment with hot water as continuously as possible, and apply in between bathings, the anodyne liniment, No. 27. When the inflammation has all subsided and the hollow in the muscle has formed, apply the tincture of cantharides, lightly rubbed in once a day, till it is pretty well blistered, then suspend it and grease the part once a day till it is healed, and then repeat the blister. Continue this treatment for several weeks and the muscle will generally re-develop. Give gentle exercise during the treatment.

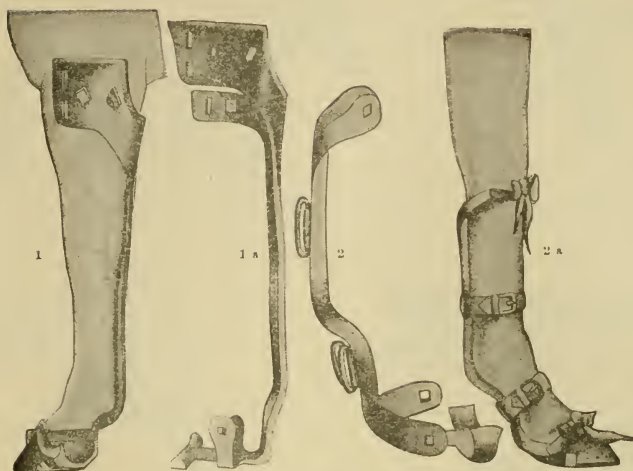
XIX. Atrophy of the Muscles.

This is a wasting away and shrinking of the muscular tissue, leaving a flattened or hollow surface in the place of a full, round muscle. It is similar in effect to rupture of the muscles, but is more extended.

Causes.—Sprains, strains, bruises, severe pressure, etc.

How to know it.—A flattened or hollow surface will be found in the place of the muscle. Compare the part with the corresponding muscle on the other side, and you will notice the affected muscle has wasted away.

What to do.—Repeated applications of the tincture of cantharides will usually make the muscle re-develop, but if it does not succeed after trying for three or four weeks, insert setons over the wasted portion about two or three inches apart, the length of the atrophy; apply a little fly blister to the setons about twice a week. Foment them with hot water twice a day. Leave them in three or four weeks. Give gentle exercise. All means frequently fail to make the muscle re-develop. The animal is often just as useful, but the wasted muscle is a constant eye-sore.

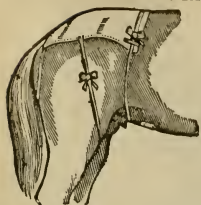


1 Brace for dislocation of the elbow applied to the horse. 1a, The same brace seen alone. 2, Brace for dislocation of fetlock 2a, The same brace applied to the horse.

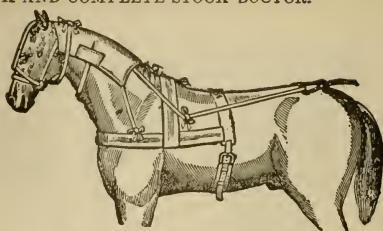


3, Brace for sprained or dislocated shoulder, 3a, The same brace applied to the shoulder.

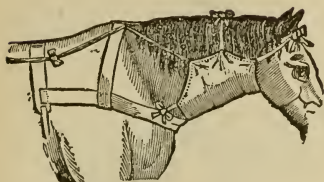
DISLOCATION OF SHOULDER AND ELBOW



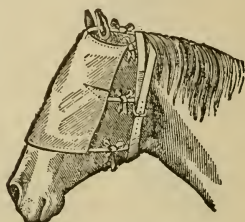
BANDAGE FOR THE
CROUP.



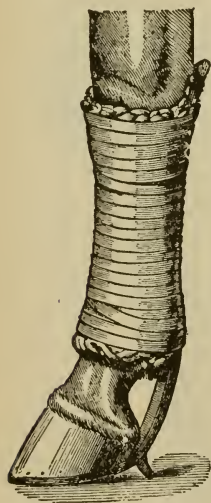
BANDAGE FOR TOP OF THE NECK.



BANDAGES FOR THE FRONT AND SIDES
OF THE NECK.

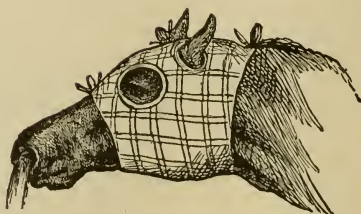


THE EYE BANDAGE.

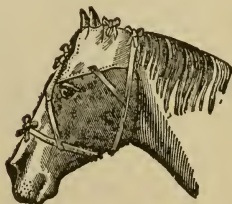


SHOE WITH IRON EXTEN-
SION.

The extension constitutes one
kind of a splint.



POULTICE FOR STRANGLES.



EAR BANDAGE.

SOME LESSONS IN BANDAGES FOR VARIOUS DISEASES.

CHAPTER VIII.

BODY OF THE HORSE, ITS EXTERNAL ACCIDENTS AND DISEASES.

- I. CARIES.—II. NECROSIS.—III. OSTEO POROSIS.—V. EXOSTOSIS OF THE JAW.
—VI. BROKEN BACK.—VII. SPRAIN OF THE BACK.—VIII. BROKEN RIBS.
—IX. BROKEN TAIL.—X. FRACTURE OF THE SKULL.—XI. TUMORS.—
XII. GOITRE.—XIII. INFLAMED PAROTID GLAND.—XIV. FISTULA OF THE
PAROTID DUCT.—XV. FISTULOUS WITHERS.—XVI. POLL EVIL.—XVII.
INFLAMED JUGULAR VEIN.—XVIII. SADDLE GALLS.—XIX. SIT FASTS.—
XX. SURFEIT.—XXI. DROPSY.—XXII. CHORDES.—XXIII. HERNIA.—
XXIV. WARTS.—XXV. RAT-TAIL.—XXVI. ITCHY TAIL.—XXVII. ITCHY
SKIN.—XXVIII. MELANOSIS.—XXIX. HIDE BOUND.—XXX. ECZEMA.

I. Caries.

This is molecular death or ulceration of a bone. It may affect any bone in the body. The bones most frequently affected by caries are the teeth; the lower jaw, from injury from the bit; the jaw bones, from diseased teeth; bones of the neck, from poll evil; spines of the back, from fistulous withers; bones of the tail, from docking—in fact, any bone sustaining an injury of sufficient severity to cause a sloughing of the bone substance.



CARIES.

Of the lower jaw—The effect of being a puller.

Causes.—Wounds, either contused, lacerated, or clean cut, affecting the bone, are liable to be followed by inflammation, ulceration, and sloughing of the bone substance.

How to Know it.—A peculiar, offensive odor is the first indication that the bone is affected—an odor of decayed teeth; the discharge that comes directly from the bone is small, but there is sufficient mixed with the pus from the fleshy surface to give the whole the characteristic odor. The surface of the bone is usually rough when felt with the finger, and has a tendency to spread if neglected. The surrounding parts always swell considerably, and become, in long-standing cases, quite hard and caloused.

What to do.—Wash the part, and make an opening on the under side, if possible, to allow a free escape of the pus; scrape the diseased surface of the bone with a dull edge, and dress twice a day, with the following lotion:

No. 28.

2 Drachms hydrochloric acid,
 $\frac{1}{2}$ Pint water,
Mix.

Apply with a swab directly to the diseased spot on the bone. This will have the effect of arresting the caries, and promoting a healthy granulation on the surface of the bone, which will fill up the hole. Continue this lotion till all disease of the bone is certainly gone; then change to No. 7, which will heal the flesh wound, or use a little tincture of myrrh, or gum balsam. If it is cold weather, compound tincture of benzoin (Friar's balsam) is probably the best for flesh wounds. These latter may be applied two or three times a day. Treatment of parts requiring particular appliances will be found under their proper heads.

II. Necrosis.

This is death of a part or the whole of a bone; usually seen in the long, harder bones of the body, and quite often in the lower jaw-bones of horses that pull very hard on the bit. Necrosis is sometimes seen affecting the cannon bones of young racers, causing the whole bone to run out, and a new one to form, but it is very rare.

Causes.—External violence is the usual cause, setting up inflammation of the periosteum (the covering of the bone), and cutting off the nutriment of the bone, so that it perishes.

How to know it.—There will be one or more openings in the skin and flesh, through which the pus will find its way; the odor of decayed teeth will be present, and occasionally a small piece of dead bone will pass out with the pus; this dead bone is called *sequestrum*. The discharge is irritating and excoriates the surface it runs over.

What to do.—Make the openings large and dependent to allow a free escape for the pus, and remove the *sequestrum* as fast as possible, for the sooner it is removed, the sooner the sore will get well. Keep the parts clean, and dress three times a day with the following lotion, if the disease is on the surface, so that it can be got at easily:

No. 29.	$\frac{1}{2}$ Ounce carbolic acid,
	$\frac{1}{2}$ Pint raw linseed oil,
	Mix.

But if the pus cavities run deep, inject lotion No. 5. If the legs are affected, put the horse in slings.

III. Big Head, (Osteo Porosis.)

Big head is the common manifestation of constitutional or generalized osteoporosis. It is a disease of the bones of the body, in which they become inflamed, swollen, softened and, finally, degenerated into cheesy matter, so soft as to be easily punctured. It may be confined to the bones of the head, either upper or lower jaw, or both, or it may attack the bones of the legs or back, causing lameness and stiffness and finally breaking down by rupture of the attachments of the ligaments, necessitating destruction of the animal. It is most often seen in the central and southern portions of the United

States, and occurs in all classes, breeds and ages of horses; sometimes in single scattered cases and sometimes affects a major portion of a herd.

Causes.—The cause is unknown, but it is thought to be due to germs of some sort in the herbage that causes the inflammation of the bones that leads on to the degeneration of them. It can not be attributed to any particular kind of food, for it occurs in horses on hay and grain, in colts at grass, in horses with good care as well as in the starved and abused ones.

How to know it.—Slow, painful mastication with an inclination to chew on one side of the mouth by turning the sore side up, and twisting the head, will be the first symptoms noticed. After a few days the side of the face will begin to swell in the region of the fangs of the molar teeth; great tenderness will be evinced upon pressure; the gums will swell and extend down between the teeth; speculae of bone pierce through and make the surface rough and cause bloody saliva to flow profusely from the mouth. After the disease attains to considerable size the nose will turn over towards the sound side; the lining of the nose swells so as to almost obstruct the breathing, giving rise to considerable roaring. If the skin is pierced the bone will be found to be easily punctured. When the back and legs are affected he will be stiff and lame with or without local swelling or soreness, resembling rheumatism, when suddenly, with some exertion, he will break down in some joint, usually the fetlock. This sometimes occurs when rising from a recumbent to a standing position, or when being driven.

What to do.—In the early stage it oftentimes can be helped by giving a change of food or pasture, and giving the following powder, night and morning, for a month, in soft food:

Half an ounce of hyposulphite of soda,
Two drachms precipitated phosphate of lime. Mix, and give as one dose.

See that the drinking water is good, and give plenty of common salt.

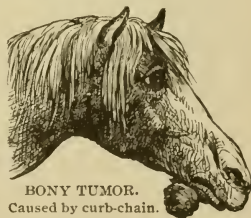
V. Exostosis of the Jaw.

This consists in the growth of bony tumors on the lower jaw, where they are quite often seen.

Causes.—It is usually caused by some external injury, often by the curb-chain.

How to know it.—They are sometimes spread over a large portion of the jawbone, with a very broad base; sometimes they are in the form of little nodules the size of the end of a man's thumb, with a very small base. They become perfectly hard and do no harm, usually, further than to be an eyesore.

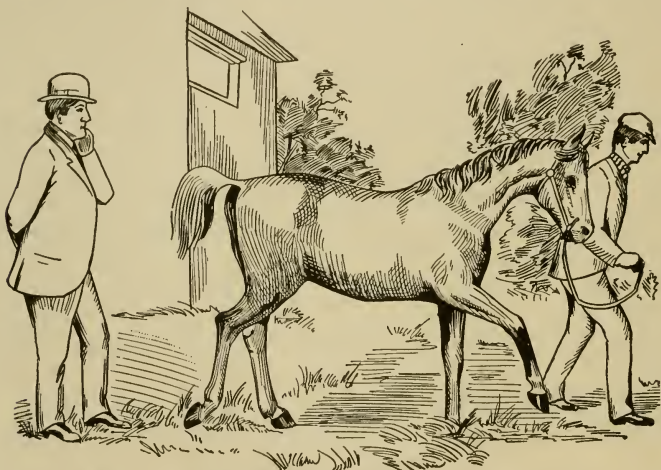
What to do.—Treatment is useless, owing to the late stage of the inflammation. If the true nature of the disease is known while the tumor is forming, repeated blistering with No. 10 will do much good.



VI. Broken Back.

Causes.—The back is sometimes broken by heavy objects falling on it; this quite frequently happens in Northern cities by snow and ice sliding off the roofs of houses. Sometimes the horse falls through traps and holes, and the back is sometimes broken when being cast for operations.

How to know it.—If the spinous processes only are broken, there will not be much change in outward appearance; but the crepitation characteristic of all fractures will be noticed and probably some alteration in the straight outline of the back will follow—it will become depressed in the region of the fracture. But, if the back is broken so as to press



HORSE SUFFERING FROM PARTIAL PARALYSIS OF HIND LEGS.

upon the spinal cord, it will cut off all sensation and power of motion from all parts back of the fracture. This inability to move and feel is paralysis and is due to the pressure of the broken bones upon the spinal cord.

Sprain of the *psœ* muscles is sometimes mistaken for broken back, but the distinguishing difference is very plain, and the test easily applied. Prick the tail or any part back of the fracture with a pin; if there is no sensation the back is injured, and the spinal cord is enduring pressure; but if the *psœ* muscles are only sprained, while there will be inability to move the hind legs, there will be sensation and ability to move the tail when pricked with a pin.

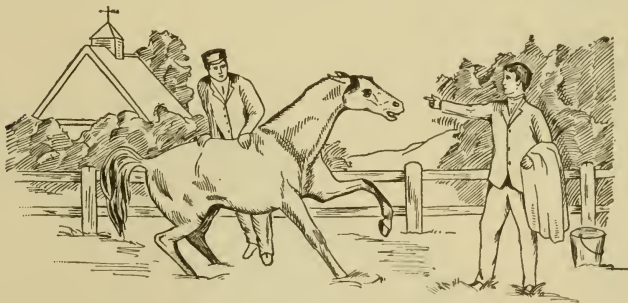
What to do.—If the spinous processes only are fractured, the animal will recover. Put him into slings if he can stand when raised; if not, leave him on the floor, as he is safer and more comfortable there than in the slings, unless he can bear the most of his weight comfortably on his feet. Apply cold water rugs to the fracture, and bathe the part occasionally with tincture of arnica or camphor. After the active inflammation has subsided, stop the cold water and just give the horse time, and nature will mend the fracture. But if any of the broken pieces of bone do not reunite, and continue to act as irritants, cut down upon them and remove them.

If the back is absolutely broken, so that there is inability to move, and no sensation in the hind parts, particularly if there is displacement, treatment is useless, and the animal ought to be destroyed, for it is only a question of a few days for him to die, and he might be saved all the suffering accompanying a natural death.

In case there are broken bones to remove, it is best to wait till the irritant is located by the abscess that is sure to follow; then, when the abscess is soft, tender, and nearly ready to break, open it sufficiently to allow the finger to enter, and remove the pieces that are acting as thorns.

VII. Sprain of the Back.

Causes.—Sometimes the back is only sprained by slips or falls, but if the sprain is severe, many of the same symptoms will be noticed, and the



TEST FOR SPRAIN OF THE BACK.

ligaments, and sometimes the coverings of the spinal cord, are involved; these are amenable to treatment but recovery is often slow.

How to know it.—Sprain of the back is diagnosed by pressing the thumb and finger along the spines, and by throwing the weight suddenly on the tender spot, when pain will be evinced.

What to do.—The treatment consists in clipping off the hair along the back, and rubbing in well the blister, No. 9. Oil the blister once a day afterwards. Repeat it if necessary after a couple of weeks. Give a long rest and a run at pasture.

VIII. Broken Ribs.

Causes.—The ribs are often broken by falling, colliding with trees, walls, etc., while running away, kicks from other horses, etc. If displacement occurs, the ends are apt to puncture the *pleura* (the membrane that lines the chest and covers the lungs), and the lungs; in either case the effects may be very serious, from hemorrhage and inflammation in the parts wounded.

How to know it.—If there is no displacement there will be no external alteration in the body, and the diagnosis must be based upon rapid breathing, the breath being cool, and effort to raise the flanks forming a crease along the sides of the belly to avoid working the ribs in breathing, unwillingness to move, and upon the horse persistently remaining standing.

If displacement takes place there will be either a bulging in or out, according to whether the ends are tipped in or out, but they are usually tipped in, leaving a hollow over the fracture, and puncturing the *pleura*, in which case there will be, in addition to the symptoms above mentioned, more evidences of pain and some bleeding from the nose, loss of appetite for a day or two, and more or less fever, according to the amount of injury done to the chest and its contents.

What to do.—After moving the horse as carefully as possible to his loose box, apply a bandage with surcingle directly over the fracture, and draw them middling tight, to prevent working of the ribs. Then watch the symptoms, and treat them as they arise, to subdue fever, stop hemorrhage, etc. The fever is best kept under control with the following mixture:

No. 30.

1 Drachm tincture aconite root,
2 Drachms fluid extract belladonna,
Water to make four ounces
Mix.

Give a teaspoonfull every two hours, if there is much fever, till it is reduced. Feed on soft feed. Give perfect quiet till the horse is willing and able to take gentle exercise, which will be in four or five weeks. Two months should elapse before the horse is put to work.

IX. Broken Tail.

Causes.—The tail is sometimes broken at the dock, or where it joins the body, by the horse falling through floors to a floor below, or by some heavy weight falling from above, or by rearing up and falling back; in fact, any accident that may break the back will break the tail if the blow strikes in the right place. The place where the fracture is most likely to occur is about three or four inches above where the tail leaves the body,—at the point where the tail begins from the upper part of the pelvis, called the sacrum.

The sacrum being without joints and inelastic, is protected by the flat bones of the pelvis, but just where the protection ceases the tail begins, so that in case of a fall on the rump, the tail is most likely to break at its origin.

How to know it.—There will be a sudden dropping of the outline of the upper and back part of the rump; the dock will be dropped down into the space between the posterior joints of the hips, pressing down the anus, and making it very difficult, if not impossible, for a mare to be delivered of a foal. A mare with the dock broken down never should be bred.

What to do.—Nothing can be done for it except to try and raise the part by introducing the hand into the anus, but as nothing can be fixed to retain the parts in position, the attempt will not be attended with success. It is no permanent injury for work, but is a great eyesore.

X. Fracture of the Skull.

Causes.—The skull is often fractured by kicks, blows, bruises, collisions in runaways, etc.



BONE TUMOR OF THE LOWER JAW (FROM A PHOTOGRAPH).

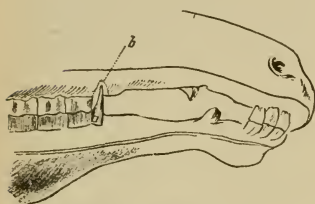


RIGHT-SIDED PARALYSIS OF LOWER LIP AND TONGUE.
Engraved for this work from a Photograph.

How to know it.—Besides the external marks of violence, there will be either stupor or delirium from pressure on the brain, and more or less

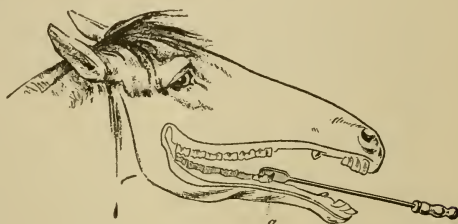
fever may follow; also accumulations of serum in the ventricles of the brain, delirium, convulsions and death.

What to do.—Trepine the bone and remove the portion that is pressed down into the skull and is liable to cause pressure on the brain. Keep the wound clean and treat it as a simple wound. If the pulse rises and fever sets in, give the fever mixture, No. 30, and apply ice poultices (chopped ice and bran) to the head continuously for several days and nights. If he gets better it will be in the course of three or four days, but if the fever rises and delirium increases it will terminate fatally in



UNEVENLY WORN OFF
JAW TEETH. (a)

The remaining sharp points causing
wound in upper jaw (b).



FILING THE REMAINING UNWORN
PROJECTING TEETH. (a)

In the same way any sharp points of the balance of the
jaw teeth are filed. It is necessary, however, to
first place a wedge between the teeth.

from three to six days. If he gets down and raves and fights furiously, he had better be hobbled to prevent him from injuring himself and his attendants. If necessary he may be thrown down on a soft bed and confined, when it will be easier to apply the ice and give the medicine, and increase the chance of recovery. In this, as in all fevers, give the patient all the water he will take—in small quantities and often. If it is in cold weather keep him warm and dry.

XI. Tumors.

Causes.—Tumors are prenatal growths, that develop on any part of the body. They may be fatty, fibrous, bony, cartilaginous, glandular, and fungoid. They develop without any apparent cause. Sometimes they do little or no harm except to blemish the appearance; at

other times they do a great amount of harm ; interrupt the circulation, breathing, mastication, cause paralysis when on the brain, and injure the eye when near it.

How to know it.—Fatty tumors, as the name indicates, are fatty in composition, and grow oftener on the internal organs, sometimes around joints. Fibrous are hard, caloused, fleshy lumps like shoe boils, lumps on the ribs, etc. Bony tumors are similar in structure to bone, though not so dense ; they grow on bones, and are often the results of bruises. Cartilaginous tumors are those that grow on cartilages, and are a part of them ; are seen on the brisket, shoulder blades, etc. Glandular tumors are hypertrophied glands, abnormal growth of the glands, and they become indurated and remain so—see goitre and inflamed parotid gland. Fungoid tumors, are those that sprout up like fungus ; they are exuberant granulations, and bleed easily when touched ; they are seen quite often around the eyes, and may grow from the surface of any wound.

What to do.—Treatment of tumors, almost always involves surgery that requires a qualified veterinary surgeon to perform. The knife should never be used to any extent, except by an expert.

XII. Goitre.

This is hypertrophy of the thyroid gland, that is situated on the under side of the neck, about five to eight inches below the angle of the lower jaw, on each side of the windpipe. It sometimes attains the size of a child's head, and presses against the trachea, so as to interfere with the breathing.



GOITRE OR BRONCHOCELE.

Causes.—The cause is unknown.

How to know it.—By the large, hard lump on the side of the neck. It is movable, insensitive, and grows slowly.

What to do.—Wash it thoroughly once a day with hot water and soap, to remove all dirt, scurf, etc., then, when dry, rub well in a piece as large as a chestnut of the following ointment :

- | | |
|---------|-----------------------------|
| No. 31. | 2 Drachms iodide of potash, |
| | 2 Ounces lard, |
| | Powder and mix. |

Continue this for three or four weeks Treatment may be carried on while working.

XIII. Inflamed Parotid Gland.

These glands are situated on each side of the throat, running from very near the ear to the angle of the lower jaw, and are about the size of a medium sized hand.

Causes.—They become inflamed occasionally from cold settling in them, or from injury.

How to know it.—There will be considerable enlargement, and soreness upon pressure in that region; hot, dry mouth; painful mastication, and more or less general fever.

What to do.—Bathe them with hot water and apply linseed poultices. Give internally fever mixture, No. 18, till the fever is subdued. If the gland suppurates and comes to a point in any spot, open it, and continue the poultices as before.

XIV. Fistula of the Parotid Duct.

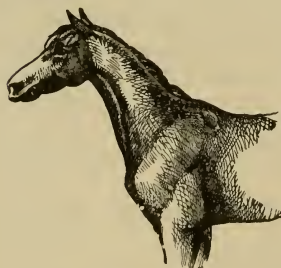
Causes.—Sometimes from a tumor or lump of hardened food in the region of the parotid duct (in the cheek opposite the third molar of the upper row of teeth), the opening of the duct becomes obstructed, inflammation sets in, and the duct often breaks out in a fresh spot. And on account of there being a constant flow of saliva, the opening soon becomes fistulous.

How to know it.—A sore is found on the cheek, usually on the outside, but sometimes on the inside; but the inner one does little harm as the saliva is not wasted. The saliva flows continuously, but more freely during mastication.

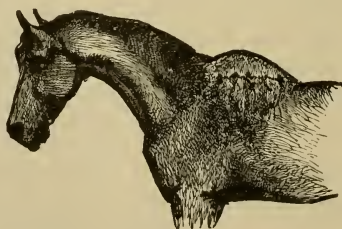
What to do.—Clip off the hair around the opening, and remove any irritant or obstruction on the inside; see that the natural opening is clear. Scarify the edges of the external opening to make a fresh wound of it; then apply the paste, No. 19, to the opening, and let a cold linseed poultice go on directly over it. Dress it in this manner twice a day, and the fistulous opening will soon close if the natural passage is kept open.

XV. Fistulous Withers.

Causes.—When the withers become bruised, swollen and festered, and



SLIGHT ENLARGEMENT WHICH MAY END
IN FISTULOUS WITHERS.



FISTULOUS WITHERS—WORST STAGE.

running sores follow, pipes are formed and constitute fistulous withers, (*thistela* of the horse doctor and cow leech).

How to know it.—A constant discharge is seen to come from the swelling around the withers and run down over the shoulder. The pipes conveying the pus are white, with thick walls, and very tough. The pus is ordinary healthy pus, unless the bones of the spine are affected, which is often the case, and then the pus will have the strong offensive odor characteristic of caried bone.

What to do.—The knife must be used freely, but cautiously, and it is urged, as in all similar cases, to employ a qualified veterinary surgeon if possible. But if it is impossible to procure one, make the best of a bad case and open the sinuses right up from top to bottom. If there is a large hollow space on the tops of the bones under the skin, open the skin right up from end to end, letting the cut run lengthwise the horse. If the ends of the bones are exposed and caried, rough, diseased, and smelling badly, the diseased portions must be removed either with bone forceps or a fine saw, and dressed twice a day with lotion No. 28. Dress the pipes with lotion No. 1, twice a day for a week, then change to No. 5, alternating them. If the bones of the withers are exposed, but not caried, use lotion No. 5 on them and alternate it with No. 7; use one a week, then the other.

XVI. Poll-evil.

This is a fistulous sore affecting the bones of the neck near the top of the head or poll.

Causes.—It starts with a bruise from striking the top of the head against a low ceiling, doorway or roof of a car when being shipped, rearing and falling backwards, etc. Suppuration sets in; the pus breaks out on the top, like any other abscess, but burrows down into the bones at the same time, differing in this respect from ordinary abscesses, so that, within a few days after bursting on top, it has burrowed down so as to reach the bones or the joint between them. In old, long-standing cases the disease sometimes causes the *ligamentum nuchæ* to become so rotted and eaten away by the suppurating process as to break, letting the head drop. The animal in this case is rendered useless.



POLL-EVIL DURING THE FIRST STAGE.

How to Know it.—There is always more or less tumefaction and flow of pus, which runs down the sides of the neck. The pus has a strong, disagreeable odor coming from the tendinous muscle, and, when coming from the bone, it will have the characteristic odor of caries.

In the course of a week or so, pipes form, and their walls get thicker and thicker as they are allowed to run.

What to do.—As in the treatment of all fistulous sores, the sinuses must be opened up and a free dependent opening made for the pus. It is more difficult to do this in poll-evil than in almost any other case; but



POLL-EVIL IN ITS SECOND STAGE.

the sinuses usually run down into the muscle of the neck more or less. Follow them and open them up freely; then, there being a free connection between the top of the sore and the bottom of the sinuses, wash it out thoroughly and inject lotion No. 5, twice a day. If it is noticed in its incipient stage, apply a linseed poultice, hot and soft, till it is ready to open; then open it and inject

lotion No. 5, twice a day; continue the poultice till the holes all fill up with fine, solid, healthy, granulations; then apply lotion No. 7, three times a day. If the bones are affected so as to expose a caried surface, wash them off with warm water and scrape the rough surface to expose the healthy bone; then dress it by applying lotion No. 28, twice a day with a swab till the exposed surface of the bone granulates so as to feel like velvet when touched with the finger; then change to lotion No. 29. Alternate lotions No. 29 and No. 5, one week on and one week off. If proud flesh springs up, keep it down with powdered bluestone.

XVII. Inflamed Jugular Vein.

Causes.—This disease is not so common as it used to be in the days of bleeding. Bleeding is rarely resorted to now-a-days; hence the infrequency of this trouble, for it is always the possible sequence of bleeding. As the effect of this inflammation, the vein is liable to become obliterated, filled up and caloused so as to remain so, the work of returning the blood to the heart being done by the vein on the other side of the neck.

A horse with a jugular vein obliterated, cannot graze on account of the rush of blood to the head, owing to the lessened capacity to return the blood from the head freely.



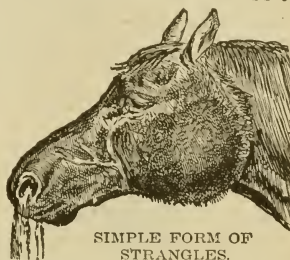
INFLAMED JUGULAR VEIN.

Position of a horse with inflammation of the jugular vein.

How to know it.—In the active stage of inflammation the vein and contiguous parts will be swollen, sore and hot. In the later, chronic stage, the vein will be a hard, inelastic ridge running down from the head to the body, above the windpipe.

What to do—After bleeding, watch the vein for several hours. If it bleeds, and the blood coagulates, and the vein begins to swell, bathe it with warm water, and manipulate the clot to try and break it down, and make it pass on. Continue this till all danger of obliteration is past. Once the vein has become obliterated, nothing can be done.

If the inflammation continues and abscesses are likely to form, apply a blister of tincture of cantharides, after having removed the pin. If sinuses form and sacks of matter are found, open them freely, and continue the hot fomentations and poultices; syringe the sinuses and abscesses with lotion No. 5. When the sinuses and wounds fill up, if any flesh presents itself too prominently, dress it once a day with burnt alum.



SIMPLE FORM OF
STRANGLES.

XVIII. Saddle Galls.

Causes.—When a badly-fitting saddle is ridden any length of time, or a saddle is kept on a back unaccustomed to carrying one, the back gets bruised, scalded with the sweat, chafed with the saddle, and the skin rubs off in spots, leaving raw sores exposed. The same applies to the collar, breast plate or harness saddle.

What to do.—Foment them with hot water with a little salt in it, three or four times a day, wipe dry and apply lotion No. 24, or the following:

No. 32.	1 Ounce vinegar,
	$\frac{1}{2}$ Ounce tannin,
	1 Quart water,
	Mix.

Sometimes the skin will become dead, and continue to hold on fast to the flesh like a scab; this must be removed with the knife before it can begin to heal. Make it a clean, fresh, active wound, and it will heal readily with the above treatment. It is absolutely necessary to remove the cause by either leaving off the saddle, collar, etc., till it heals, or by remodeling the same so as to give an even bearing on the back or shoulder.

XIX. Sit Fast.

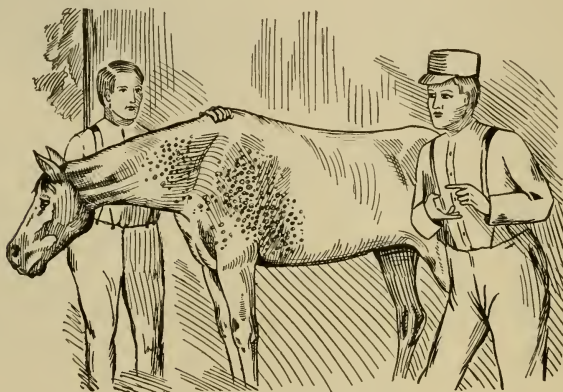
Causes.—These are large, calloused, tumor-like lumps on the back, as a result of saddle galls, or on the points of the shoulders, from collar galls. When the animal is continued at the work that causes the galls, these calloused swellings make their appearance.

What to do.—Any treatment other than the knife is of little use. They can be easily dissected out by cutting around them carefully and taking them out bodily; then treat the wound as a simple wound. Keep all

pressure off till it is thoroughly healed. A breast collar can often be used in the place of the ordinary collar, while waiting for the wound to heal.

XX. Surfeit.

Surfeit is the term applied to the breaking out of pimples on the skin. It is an effort of nature to throw off some of the impurities of the blood, due to plethora. When the body gets fat and the blood rich, the liver and kidneys often become inactive, and that throws an extra amount of work upon the skin; and surfeit is the effort of nature to get rid of superfluous heat and effete matter.



A HORSE AFFLICTED WITH SURFEIT.

Causes.—Too high living, with too little exercise.

How to know it.—A rough, scabby surface will be found on the skin. Sometimes it comes out, suddenly, all over in little blotches, that may disappear in the course of a few days, or may scab over, owing to the surface fever that usually accompanies it. Little or no difference, otherwise, is noticed in the health, of the horse. There is sometimes a great amount of itching, and sometimes none.

What to do.—From the nature of the affection, the treatment indicated is to deplete the system. The best way to do is to give a full dose of purgative medicine, restrict the food, and give more exercise. The best purgative for the horse is from four to seven drachms of Barbadoes aloes, according to the size and age of the patient, and the time of year. Six drachms is the dose for an ordinary-sized horse. Larger doses may be given in the spring than in the fall. The dose must be diminished in

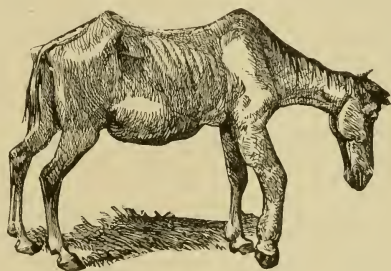
size for tender years, even if the colt is as large as he ever will be. The aloes may be given in a bolus the size and shape of your finger, and passed back into the throat with the right hand, while holding the mouth open with the left; or it may be given dissolved in a pint of warm water, with a bottle. Feed on bran mash for a couple of days after taking the ball. After the ball has finished working, give a tablespoonful of the following mixture, night and morning, in the feed:

No. 33.	2 Ounces nitrate of potash,
	2 Ounces rosin,
	2 Ounces linseed meal,
	Powder and mix.

No local treatment is needed, except to give all the necessary grooming the condition of the skin will allow.

XXI. Dropsy.

Causes.—Dropsy is rather the result of disease, or the result of a peculiar condition of the system, than a disease itself. It depends upon



CROW-BAIT—EFFECT OF DROPSY.

a debilitated condition, the result of other weakening diseases, especially of the kidneys, and starvation; it sometimes comes from diseased and irregular teeth.

How to know it.—It is manifested by swelling of the legs, belly, and sheath; languor; pallor of the visible mucous membranes; indifference to food; emaciation with weakness etc.

What to do.—It is of paramount importance to remove the cause the first thing; therefore examine the teeth, extract any that are decayed, rasp

off the sharp edges next to the cheeks; sometimes one gets broken, and the one opposite, having none to wear against, grows long and sticks directly into the gum, making mastication very difficult and painful—in this case, rasp or saw it off. If the cause lies in a debilitated condition from some other disease, tonics are indicated. If the appetite is good, give the following powder:

- No. 34. 1 ½ Ounce pure sulphate of iron,
 1 Ounce nitrate of potash,
 2 Drachms fœnugreek seed,
 2 Ounces linseed meal,
 Powder and mix.

Give a tablespoonful night and morning in soft feed. If there is not sufficient appetite to take medicine in the feed, give the following:

- No. 35. 1 Ounce tincture of iron,
 1 Ounce tincture of gentian,
 Water to make twelve ounces.
 Mix.

Give one ounce (two tablespoonfuls) three times. Tempt the appetite with whatever he may fancy; sometimes when a horse won't eat oats he will eat corn or apples, carrots, cabbage leaves, etc. Continue the tonics till all signs of dropsy are gone, and give gentle exercise as soon as the strength of the horse will allow.

XXII. Chordes.

This is a name applied to cramps of the muscles of the neck and loins; it is of a rheumatic nature, and is most common in spring, fall and winter.

Causes.—Exposure to cold and damp by sleeping on the ground in wet, cold weather.

How to know it.—It may be known by swelling of the muscles of the affected parts, tenderness on pressure, neck twisted around towards one side, and is stiff, so that the horse cannot feed off the ground. The horse under these circumstances is stiff and sore all over.

What to do.—Apply hot rags, wrung out of very hot water, and laid on the sore muscles. Keep him warm and in a dry place. Give one of the following powders in soft feed three times a day:

- No. 36. 1 Ounce colchicum seed,
 1 Ounce nitrate of potash,
 2 Drachms fœnugreek seed,
 Mix.

Divide into twelve powders. Give gentle exercise.

XXIII. Rupture or Hernia.

Hernia or rupture is the breaking away of the parts that contain the bowels, sometimes in one place and sometimes in another. The different hernias are named from their location: Scrotal hernia is rupture into the scrotum, and the bowels pass down through the abdominal rings into the scrotum; this only occurs in stallions. Inguinal hernia is rupture into the groin through one or both abdominal rings. Ventral hernia is when the abdominal walls are ruptured and let the bowels through into the skin; this is most liable to grow to enormous size. Umbilical hernia is rupture through the opening through which passed the cords during foetal life, and which never has closed.

Causes.—The last mentioned one is from a natural defect; the others are from blows, kicks, great strains in jumping, pulling, falling, and in the case of the stallion, it is usually caused by the exertion peculiar to his labor.

How to know it.—There is a soft, puffy swelling on a surface that ought to be smooth; it is easily pushed back and remains so as long as pressure is maintained. Scrotal hernia is found in the scrotum; the scrotum is larger than it ought to be, and the hernia is often attended by very serious results, such as colic, strangulation of the gut, inflammation of the bowels in that region, mortification and death. Inguinal hernia is found in the groin or flank, and is nearly as bad as the scrotal. All the different kinds of hernia are liable to fatal termination as described for the scrotal. Sometimes the omentum or caul (the membrane holding the bowels together) only is protruded; then it is not so bad and not liable to a fatal termination unless the opening enlarges and allows the bowels to protrude too.

What to do.—Try and reduce the hernia by pushing it back; then introduce skewers crosswise through the skin over the opening, and wind silk around the skin, below the ends of the skewers, middling tight; then put on a compress and give the part considerable pressure. If this is not successful there are other operations, such as opening the skin and sewing up the opening in the abdominal wall with catgut sutures; injecting salt and water under the skin, etc. But these all require the skill of the veterinary surgeon.

Scrotal hernia is the hardest to overcome, and nothing but castration will do it in some cases. Introduce the hand into the rectum and endeavor, if possible, to remove the gut from the hole leading to the scrotum. This done, put the horse in a stall where the hind legs stand the highest, and feed on concentrated food, with as little bulk as possible, and give perfect rest. If this fails, he will have to be castrated by using the clamps and enclosing the external coverings of the cord, except the skin.

XXIV. Warts.

Description.—Warts are small, rugous, mammillary tumors of very little vitality. They may come on any part of the body, but usually come in the greatest numbers and most frequently on the head. They are composed of filaments that are semi-fibrous, and are rooted in the skin. Sometimes they are tough and hard; at other times they are soft, and bleed easily. They are flat or pedunculated.



HEAD COVERED WITH
WARTS.

What to do.—If they are pedunculated, clip them off with a pair of scissors, or tie them off with a silk thread; then, when done bleeding, cauterize them with lunar caustic, or touch them with a red-hot iron. The latter may be resorted to, to stop the bleeding if necessary. If they are flat, burn them with nitric acid once a day, till they are destroyed. When well burned down, grease them once a day with fresh lard. It may be added that attempts at charming them off do not generally succeed.

XXV. Rat-Tail.

This is loss of the hair of the tail, from disease, destroying the hair follicles, and leaving nothing to reproduce hair from; consequently it is incurable. It is called rat tail, from its resemblance to the caudal extremity of a rat. Sometimes a rat tail is not so bad but that it will pass for a light tail, and sometimes there are only half a dozen hairs, nearly ruining the appearance of an otherwise good looking horse.

XXVI. Itchy Tail.

This is an itchy condition of the tail at its origin or dock.

Causes.—It is caused either by filth, surfeit, worms in the rectum, mange, or some other parasitic disease.

How to know it.—The horse is continually rubbing his tail against posts, the fence, or anything he can reach, till he rubs off nearly all the hair from the dock.

What to do.—Wash it well with soap and water once a day, and saturate the hair with a strong lotion of salt each time. If that does not cure, give injections of salt and water, and apply lotion No. 24, to the tail three times a day. If that does not effect a cure, give the horse a purging ball, No. 23; and use lotion No. 32 on the tail.

XXVII. Itchy Skin.

This is scientifically known as prurigo. It is an itchy condition of the skin all over the body, which sometimes makes the horse almost frantic, rubbing, scratching and biting himself continually.

Causes.—It is one form of surfeit when not due to mange or hen lice, and is caused by a heated, surfeited condition of the body, which manifests itself in this manner.

What to do.—Give the horse a purgative, No. 23, and when he has finished purging, give a tablespoonful of the following, in bran mashes morning and night.

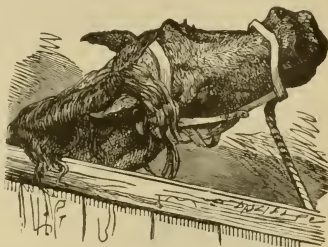
No. 37.

4 Ounces Epsom salts,
2 Ounces nitrate of potash
4 Ounces linseed meal,
Mix.

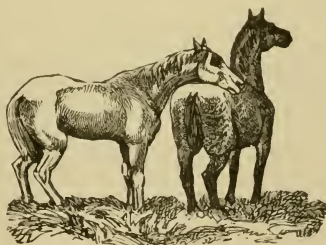
Wash him all over with soap and water, and when dry, sponge him over with vinegar. If practicable, give green food for a month.

XXVIII. Melanosis.

This, although a constitutional disease, is only seen to be recognized during life, on the surface of the body, therefore it will be described in this chapter.



SHOWING SIGNS OF PRURIGO.



PREDISPOSED TO MELANOSIS.

Color and class of horses usually affected with melanosis.

Melanosis is considered to be a species of cancer. It is a black tumor forming on any part of the body—in the lungs, liver, muscular and areolar or connective tissue. It is, in the latter, immediately under the

skin that it is found during life in the horse; usually around the tail. Pus cavities and abscesses are apt to form around them. One fully six inches deep, and located under the tail was seen by the author lately.

They seem to be confined to white horses; even grays are not afflicted with them.

Causes.—The cause lies in the blood—in the form of a predisposition to cancer.



MELANOSIS.

Dock of a horse afflicted with melanosis, showing loss of hair as an effect of the disease.

How to know it.—Black tumors form under the skin but show through quite distinctly; they are usually flat and irregularly round, about half an inch or an inch thick, sometimes not larger than hickory nuts, and sometimes they are seen the size of a man's hand. Nasty, disagreeable sores often form around them.

What to do.—When they first make their appearance, they can be cut out with perfect safety. If sores form, clean them out, scarify the surfaces and dress them with lotion No. 5, three times a day. Give internally the following mixture :

No. 38.

2 Ounces potassium iodide,
1 Pint water,
Mix.

Give two tablespoonfuls morning and night, in a bran mash. Continue this for about three weeks; then omit two weeks and repeat.

XXIX. Hide Bound.

Causes.—Hide bound is the effect—not the disease itself—of some derangement in the system, that interferes with the general health, and gives rise to a generally unthrifty condition. It may be due to indigestion, diseased teeth, exposure to cold, and starvation. Abuse is a common cause; no horse can thrive and look handsome that is pounded, jammed and banged around.

How to know it.—The skin is as tight on the body as a glove on the hand, and the hair all stares the wrong way. A thin condition is usually an accompaniment of hide bound. The hair is dry, and skin dirty—full of dandruff.

What to do.—Remove the cause—if exposed to cold storms, shelter him. Examine the teeth, and if the edges of the molars are sharp, rasp them off with a rasp for the purpose. If starvation be the cause, feed better, and the skin will begin to loosen as soon as the horse begins to thrive, and will become oily and soft. If the manure has a strong smell, give him a purgative, No. 23, and a teaspoonful of saleratus in soft feed, once a day, for a while. Give regular exercise.

XXX. Eczema.

This is the name applied to a scabby, pimply condition of the skin.

Causes.—Heat, either from the sun, or fever in the skin from getting wet and the sun coming out hot and scalding the back, or getting wet and remaining so a long time in the fall, this chills the skin, and the fever is the reaction and eczema is the result.

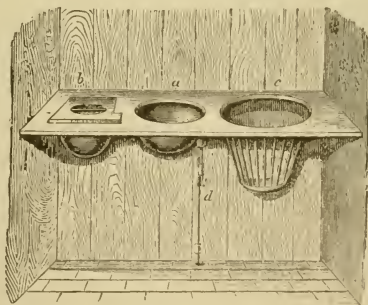
How to know it.—The skin is covered over the neck, back and hips, and sometimes over the belly and sides, with scabs usually about the size of your little finger nail, and as thick as they can stand, giving a rough, pimply appearance and feel to the skin. It seems to cause no inconvenience, not affecting the health at all, nor even to cause itching.

What to do.—Treatment is unnecessary, for as soon as the horse is sheltered from the sun in summer and storms in the fall, the scabs will gradually come off. Grooming will assist in removing them. When they are removed the hair has a rough, dirty appearance for a few days, but will soon regain its smoothness and luster.

JACK AND STALLION SORES.

A form of eczema is often seen in jacks and stallions due to overfeeding and idleness. It breaks out on the legs or any part of the body and is inclined to become chronic, in fact it often defies treatment. These sores sometimes itch so badly that the animal will bite or rub them till the skin is destroyed, leaving them ugly, raw, suppurating surfaces.

What to do.—Give the animal a purgative, No. 23, and repeat every two weeks for two to four times. Give internally as an alternative one ounce of glauher salt night and morning in soft feed for about a week in between purgatives. Reduce the grain rations one-half, and mix a double handful of dry bran with each feed. Locally,—Wash the sores with soap and water once or twice a day, dry them with absorbent cotton and apply a little of lotion No. 7, after shaking the bottle well. The lotion may be applied three to six times a day. Keep the animal from rubbing or biting it if possible, for one bite or a rub will do more harm than can be cured in a week. A little petrolatum may be rubbed in to the skin around the sore once a day.



ENGLISH FEEDING TABLE WITH SEPARATE PLACE FOR HAY, OATS AND WATER.

The rack basket is fastened under the table. Parts of dust falling at once to the floor. (a) Oats crib, (b) water bowl, (c) rack basket, (d) halter hook.

CHAPTER IX.

DISEASES OF THE RESPIRATORY ORGANS.

- I. TUMOR IN THE FALSE NOSTRIL.—II. POLYPUS.—III. CATARRH.—IV. NASAL GLEET.—V. LARYNGITIS, ROARING AND WHISTLING.—VI. QUINSY.—VII. BRONCHITIS.—VIII. PNEUMONIA.—IX. HEAVES.—X. CONGESTION OF THE LUNGS.—XI. PLEURISY.—XII. HYDROTHORAX.—XIII. CHRONIC COUGH.

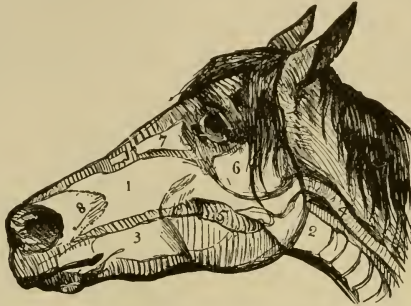


DIAGRAM SHOWING RESPIRATORY ORGANS IN THE HEAD OF A HORSE.

- 1.—The nostril leading direct to 2.—The larynx, situated at the commencement of the windpipe. 3.—The tongue. 4.—The oesophagus or gullet. 5.—The soft palate, which lies upon the tongue and affords a resting-place whereon reposes the epiglottis, or the guardian cartilage to the entrance of the larynx (2). 6.—The guttural pouches, or large membranous and open sacs, containing nothing but atmospheric air. 7.—Nasal or frontal sinuses. 8.—The false nostril.

I. Tumor in the False Nostril.

The false nostril is the small pouch or *cul de sac* on the outer side of the lower edge of each nostril. Tumors are liable to form in these, and partake more of the nature of abscesses, in that they are filled with pus of a cheesy consistency, but are tumors in that they form slowly and do not point and break like an abscess. They are usually about the size of a hen's egg; they are not sore, but cause more or less wheezing in the breathing on account of the diminished capacity of the air passage.



FACE OF HORSE.

Showing appearance of muzzle when there is a tumor in the false nostril.

How to know it.—A small swelling will be apparent on the outside, but the main dependence is to be placed upon the examination of the nostril, when it will be found to be nearly closed by the tumor in the false nostril.

What to do.—It can be opened without the slightest danger. Insert the knife inside the nostril and make a free opening and evacuate the pus. Inject lotion No. 6, twice a day. It is not likely to recur.

II. Polypus.

This is a tumor-like excrescence growing in the nostril. It may form in any part of the passage from the muzzle to the throat. It is usually a fleshy bulb, on a pedestal or neck. It varies in size from a cherry to a man's fist.

How to know it.—The breathing is obstructed, to a certain extent, and, upon examination, the polypus is found.

What to do.—Cast the horse, and catch firm hold of it with the forceps for the purpose, then pass the chain of an *ecraseur* over it, and cut it out close to the surface from which it grows. A fine copper wire may be used, if the *ecraseur* cannot be had; pass the wire over the polypus and twist it off. There will not be hemorrhage to do any harm. The polypus may grow again, but it is not very likely to.



FORCEPS.

For grasping the polypus for removal.



POLYPUS.

Hanging from the upper part of the nostril.

III. Catarrh.

Under this name are included acute catarrh and the common cold when it is confined to the nose. It is simple in itself, but all inflammations of the upper air-passages are liable to run down into the lungs and cause bronchitis and pneumonia, which are always serious. Catarrh is inflammation of the mucous membrane of the nostrils, and often extends to the sinuses of the head, especially the frontal sinuses situated between the eyes.

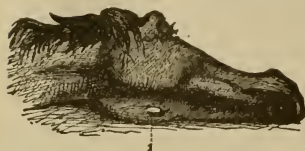
Causes.—Exposure to cold winds, rain and snow storms, cold nights, etc.

How to know it.—There is always a discharge from one or both nostrils. The discharge is thin watery mucous at first, and turns to muco-purulent in the course of a couple of days; and then to purulent, if not properly treated. The muco-purulent is white and frothy; the purulent is yellow, and has an offensive



A HORSE'S HEAD WITH COLD.

odor. In bad cases, there is considerable fever, loss of appetite, and redness of the eyes. If neglected, and nature is not vigorous enough to throw it off, it becomes chronic, and is known as nasal gleet. Sometimes the lymphatic gland, under the lower jaw, enlarges.



LYMPHATIC GLAND OF THROAT
SWOLLEN.

1.—The enlarged lymphatic within the jaw.

on soft feed, give a teaspoonful of saltpetre in a bran mash night and morning. If that does not perform the work satisfactorily, give the fever mixture, No. 4. If there is much fever and loss of appetite, give No. 18. In all bad cases, give rest till the horse is better. If the attack is prolonged to a week or more, during convalescence, give the tonic No. 22, and syringe the nostrils out, two or three times a day, with the following lotion :

No. 39.

2 Drachms carbolic acid.

1 Pint of water,

Mix.



NOSE BAG.

For steaming horse with cold.

Apply the blister No. 41 to the throat, letting it go well up towards the ears. If the skin is not mildly blistered with one application, repeat it after twenty-four hours ; then grease it once a day with fresh lard. When the discharge does not come freely, it can be helped by steaming the head in a bag of hot bran.

IV. Nasal Gleet.

This is the name given to chronic catarrh, and is always complicated by extension of the disease to the sinuses of the



A HORSE WITH THE THROAT
BLISTERED.

head, often causing the bone over the one affected to bulge out, as if swollen.

Causes.—Neglected or obstinate catarrh, that will not yield to treatment with an ordinary amount of perseverance, are the only causes. The sinuses of the head are all in communication with each other by tubes and passages. When inflammation extends to them, the swelling of the mucous membrane closes these passages, and confines the pus with suffi-

cient force to cause the bones to bulge out, but there will be a constant flow of pus from the nostril, sufficient being forced through the passage by the pressure to keep up the discharge.

How to know it.—The general health is not in the least affected, except, perhaps, in long standing cases. There is a continual flow of thick, offensive, yellowish matter that will usually sink in water. One nostril usually runs more than the other, and oftentimes the chronic trouble is entirely confined to one side. The face between the eyes will be found to be full, giving a dull, solid sound when tapped on each side of the median line running down the centre of the face. In long standing, bad cases the bone of the face, referred to above, will be bulged out, and great pain evinced when tapped.

Pus is, naturally, the blindest secretion of the body; but being confined, it corrupts, and then smells abominably. The facial sinuses formed in nasal gleet, open to the nostrils on either side by two comparatively small flaps, slits or valves. These are their only means of communication with the external atmosphere; and through these valves all the pus must flow. It is not surprising that such structures occasionally become clogged, till the accumulated secretion, or the increased breathing, or the position of the head, obliges the passage to give way.

What to do.—If the sinus is full, there is no cure for it without the operation of trephining to remove a portion of the bone, to evacuate the sinus, and give local treatment; but if there is no bulging of the bone, it may be cured by syringing out the nostril with warm water to clean it, then injecting a little of lotion No. 39 with a long-nozzled syringe, using considerable force to cause a spray when it strikes the back of the nose. Repeat this, morning and night, for a month or so, and give internally, No. 34. The operation of trephining the frontal sinus, will be found described in the chapter on operations.

All treatment, except the operation, may be continued and the horse kept at his work, unless he is laid up on account of the appearance of the nostril, as it looks very bad to drive a horse with a chronic discharge from the nose.



NASAL GLEET.
Horse affected
with nasal gleet
and bulging of
the frontal sinus.

V. Laryngitis, Roaring and Whistling.

This is what is ordinarily known as sore throat. The inflammation lies in the lining of the larynx—that is, the cartilaginous box in the throat, which is the upper end of the windpipe or *trachea* containing the vocal cords, and is the seat of roaring.

Causes.—Exposure to cold winds and storms, standing in drafts when warm, neglect when coming in when warm from work, and extension of catarrh from the nose. The cause of roaring is chronic inflammation of the mucous membrane lining the larynx, diminishing the air passage so that when he is unable to get sufficient air, and forcing it through the small passage, makes the noise.



EFFECT OF LARYNGITIS.

A horse trying to drink, the water returning by the nose.

How to know it.—The throat is usually swollen on the outside, but sometimes only on the inside, and is tender upon pressure; the nose is protruded; he has great difficulty in swallowing, and often, when drinking, the water will come back through the nose nearly as fast as it goes into the mouth, and what is swallowed is forced down with an effort. There is usually a short, painful, subdued cough, dry at first, but getting more moist after a couple of days.

What to do.—Clothe warmly; shelter from cold storms and drafts; rub mustard paste well into the throat on each side, well up towards the ears; feed on soft mashies, boiled oats, etc., and set a pail of water in the manger for him to play in to cool the throat and mouth. Give internally fever mixture No. 4, every two hours till the fever is reduced and the pulse lowered; then drop off to three or four times a day. If the swelling in the throat does not yield to the above treatment, apply a soft, hot linseed poultice to it, and change it once a day for a fresh one. The loss of appetite, or rather inability to eat, will soon disappear and recovery will be rapid.

In case of roaring, apply a smart blister of cantharides, No. 9, to the throat, and after three weeks repeat it. Inject a tablespoonful of the mixture No. 35, three times a day well back into the throat, and let the horse run at grass or feed on very soft food.

Bad, long standing cases of roaring are incurable. Whistling is similar to roaring, except in the noise produced; it is subject to the same causes and treatment.

Roaring and whistling are sometimes, but very rarely, the effect of paralysis of the nerves of the larynx, letting one or more of the cartilages drop into the box to a certain extent, and thereby diminishing the caliber of the air passage. Sometimes a small portion of the cartilage doing the damage can be removed, but it requires the skill of a qualified veterinary surgeon.

VI. Quinsy.

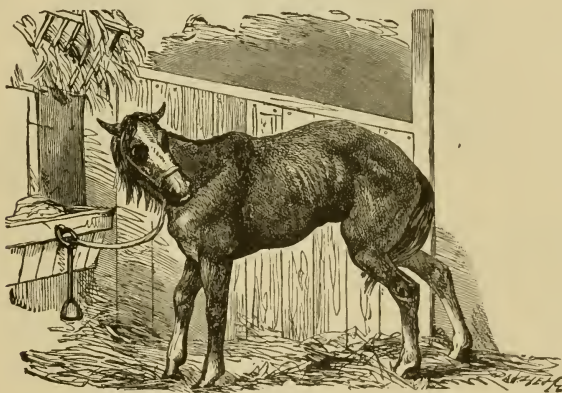
Causes.—Sometimes the inflammation in the throat in laryngitis is so great and deep seated that abscesses form in the throat, producing quinsy. It is caused by the same agents as laryngitis, and is always more prolonged in duration than simple sore throat.

How to know it.—It may start with all the symptoms of laryngitis but will not yield to treatment at first. The throat gets sorer and sorer from day to day, till suddenly the abscess bursts, and a tremendous flow of pus comes from the nostril, and the animal will be relieved at once. Quinsy lasts from one to three or four weeks, and is very apt to be followed by roaring or whistling.

What to do.—Apply the same treatment as prescribed for laryngitis. Continue the linseed poultices right through; apply them so as to cover the throat nearly to the ears, and keep them quite soft.

VII. Bronchitis.

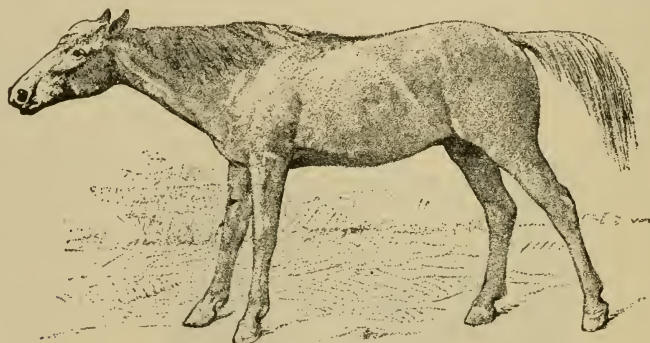
The bronchial tubes are the two branches of the trachea or wind pipe; they lead to the lungs. Inflammation of these branches, and also of the lining of the tubes as they ramify through the lungs, is known as bronchitis.



A FIT SUBJECT FOR FOUNDER OR BRONCHITIS.

Causes.—The same exposures that cause catarrh and sore throat are prolific agents in producing this disease. And there is a very great tendency in the horse to inflammations of the upper air passages which run down upon the lungs, so much so that many cases of catarrh and laryngitis terminate in bronchitis and pneumonia.

How to know it.—It is always ushered in with a shivering fit, but this fit is seldom seen, and if seen is thought nothing of by most people; the chill passes off and the reaction brings fever; the pulse runs up to fifty or sixty, is soft, full and bounding; temperature soon runs up to 102° or 103° F.; the breathing is hurried and the nostrils are distended. If pressure is applied to the chest just above the breast bone, pain will be evinced and a cough provoked, which is soft, deep and subdued, great pain being manifested while coughing; the horse is loth to move; if the ear is placed to the nostril a grunt will be heard with each breath; and if the ear is placed in front of the chest a thick, unnatural sound will be heard; the ears and legs are usually cold; the appetite is indifferent. All of these symptoms will be noticed in the course of ten or twelve hours. In the next twenty-four hours the pulse may run up to 70, and the temperature to 104° or 105°; the pulse will be soft and full; the cough will increase and the thick, heavy sound when the ear is applied to



HORSE WITH STIFF CRAMPS.

Head stretched. Mouth clamped together. Front feet spread (saw buck position) cramps causing the muscles of the tail to raise.

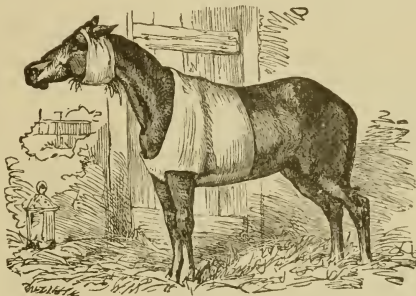
the breast will have run into a harsh, grating sound; the horse persistently stands; drinks considerable water, and the appetite will be lost in most cases; the mouth will be hot to the finger placed under the tongue; the breath is hot as it comes from the nostrils, and the urine is scanty and high colored. The horse may die from continuation of the inflammation and extension of it to the lungs proper, or may drown in the mucus that is secreted in the passages forming the next stage following the dry one; in this last a rattling bubbling sound is heard when the ear is applied to the chest above the breast bone, by the air rushing through the mucus.

Convalescence will be noticed by a diminution of the mucous rattle; falling of the pulse and temperature; return of the appetite; and a generally relieved appearance; ability to lie down and rest quietly, and the frequency of the breathing lessened.

What to do.—If seen during the chill, give two ounces of whiskey in a little water and follow it with No. 4, for the next twelve hours; then, if better, continue the same at longer intervals, but if worse, change it to the following:

- No. 40.
- 1 ½ Ounce sweet spirits of nitre,
 - 1 Drachm tincture of aconite root,
 - 2 Drachms fluid extract belladonna,
 - 1 Ounce tincture of gentian,
 - 1 Ounce powdered saltpetre,
 - 1 Ounce powdered sal ammoniac,
 - Water to make one pint,
 - Mix.

Give a wine-glassful every two hours till the horse is better, then drop off to three or four times a day. Set a bucket of water in his manger. Give scalded oats to eat; if he won't eat them try him with other things



A HORSE DRESSED FOR BRONCHITIS.

—a couple of ears of corn three or four times a day, carrots, apples, good hay, etc. Rub a little of the following liniment well into the sides over the lungs, and on the chest once a day till it is well blistered:

- No. 41.
- 2 Ounces liquor ammonia,
 - 2 Ounces spirits turpentine,
 - 2 Ounces linseed oil,
 - Mix and shake.

When the blistering has been carried far enough, rub a little fresh lard well into the hair once a day to take out the scabs without pulling out the hair. If the skin comes off anywhere from the blister, apply No. 24 to the spot three times a day.

Give plenty of pure air to breathe, but avoid drafts and dampness; see that the drainage is good. Remove him from the other horses if pos-

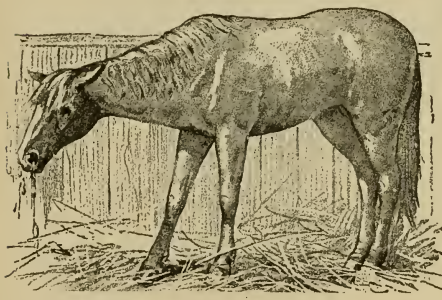
sible, on account of the vitiated air he would have to breathe in the stable with them.

When convalescence is well established and there is much weakness, change the medicine to No. 18, but do not give it as often as every two hours, unless there is still a good deal of fever; three times a day is often enough in most cases.

When the fever is all gone, change the medicine to No. 35, if the appetite is poor, but if it is good, give No. 34 in the feed. Give gentle exercise when well enough to bear it. The horse should be well clothed, and the legs bandaged. Bring him back to his feed and work gradually. While wearing the bandages they should be removed morning and night, and the legs well rubbed and the bandages replaced.

VIII. Pneumonia.

This is inflammation of the lung tissue; oftentimes the right lung only is affected. Pneumonia is rather rare, at least it is far less common than bronchitis, and sometimes the two diseases are combined in the form of broncho-pneumonia. It may be either sporadic or infectious. In the latter case it is seen as a complication of influenza, and has typhoid symptoms, and is occasionally enzootic, or may be epizootic.



HORSE WITH CHEST AILMENT.

Front feet spread. Strong running of the nose after coughing.

Causes.—The same as for other acute affections of the air passages, except when existing as a complication of influenza, then it is due to a micro-organism (the pneumo-

coccus). The sporadic form will usually recover if given a fair chance, but the infectious is frequently fatal.

How to know it.—The first stage is the shivering fit and sanguineous congestion, in which there is a rush of blood to the lungs; high fever follows the chill, the pulse runs up to sixty to eighty, and is soft and weak; the temperature is likely to run up to 105° to 107° Fahr. The breath is hot, and breathing labored and fast—respirations running up to twenty-five to thirty-five per minute; the ear being applied to the sides, the grating sound indicative of inflammation is heard; there is no cough; ears and legs are cold; the body heat is great, and the urine scanty and high colored.

The second stage is that of hepatization, in which the lungs become solid, like liver; no sound is heard at all by the ear when applied to the side, and,

when tapped, it sounds solid like a barrel when full of water—the natural when tapped being resonant, like a drum. The lower part of the lung being usually most affected, the breathing is floated upward, as it were, and becomes shallow; the breath becomes cold in consequence; the nostrils



HORSE WITH PNEUMONIA.
The appearance of a horse in the early stage of pneumonia.

flap, and the horse thrusts his nose through the windows or doors of the stable in search of more air; the flanks heave; the ribs are worked violently in and out; the legs spread to stand in a braced position; the strength becomes exhausted, and the system suffocates for want of oxygen, and the animal usually dies in this stage.

If he lives through this stage, the third stage begins—that of absorption; in favorable cases this goes on to so great an extent that recovery is complete. Unfavorable cases fail to absorb the liver-like condition of the lung, and suppuration sets in; the whole diseased portion may turn to pus, and be thrown up through the nose, where it has a grayish, lumpy appearance. This is the fourth stage, and is always fatal; the discharge is extremely offensive, attracting hosts of flies and rendering a whole stable unfit for other horses to remain in.

In this, as in bronchitis, the horse never lies down till he is very much better, or nearly well.

In infectious pneumonia, in addition to the above symptoms, there will be marked yellowness of the mucous membranes, more rapidly developing weakness than in the sporadic form, and occasionally diarrhoea and other symptoms of influenza.

What to do.—The same treatment prescribed for bronchitis will apply to this, and, in addition, during recovery, if weakness is great, give malt ale in pint drenches three times a day. If

there is no appetite, put the ale in with oatmeal gruel, and give them as a drench together. Clothe him warmly, and give plenty of fresh air to breathe, but avoid a draft. It is a good plan, when feasible, to isolate him from all other horses, particularly in the infectious form.



THE POSITION ASSUMED BY THE HORSE
DURING AN ATTACK OF
PNEUMONIA.

If the fever remains above 104° F. longer than three days give the following mixture:

- No. 91. $\frac{1}{2}$ Ounce sulphate of quinine,
 1 Pint of whisky,
 $\frac{1}{2}$ Pint of water.
 Mix.

Give a wineglassful every two to four hours, alternating with the following mixture:

- No. 92. 1 Ounce tincture of nux vomica,
 1 Ounce tincture of gentian,
 Water to make one pint.
 Mix.

Give a wineglassful every two to four hours.

Keep the stable clean and sprinkle chloride of lime around it freely once a day. Give no exercise till convalescence is well established.

IX. Heaves.

The lungs are made up of an innumerable quantity of small air cells, and the lung tissue is capable, to a great extent, of expelling the air from it, and drawing more in by virtue of the elasticity and contractility it possesses. Sometimes many of these cells become ruptured into one large cell, which destroys the contractility of that portion of the lung, in which case the diaphragm, ribs and abdominal muscles are brought into use to expel the air, giving rise to the second spasmodic, twitching effort seen in the flanks. This condition constitutes heaves, also known as broken wind.

Causes.—The most common cause is driving too fast, and keeping it up too long when the horse is not in condition—either having his stomach too full and not giving the lungs room, or the lungs themselves are weak from very light work, or entire disuse. Horses fed entirely on dusty Timothy hay, are more subject to it than those fed on prairie hay. A horse is more likely to get the heaves when driven fast against the wind than with it; the lungs get very full of air, immensely distended by the extra amount taken in, and if kept at that kind of work any length of time, the lung tissue gives way, and a rupture is the consequence.

How to know it.—Instead of the regular, easy breathing noticed in the flanks, there is a second effort made by the jerking of the muscles of the flank. When the ear is placed against the side over the lung, a whistling, wheezing sound is usually heard. When once begun it is very apt to increase, and often renders the horse useless.

What to do.—It is incurable, but it can be alleviated by careful feeding, giving as condensed food as possible, with a view of getting the greatest amount of nourishment in the smallest compass. Wet everything

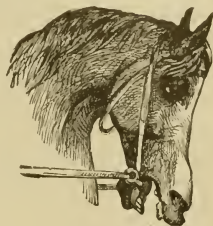
he eats, to lay the dust. Give the following mixture twice a day in soft feed :

No. 42. 2 Ounces powdered lobelia seed.
 2 Ounces linseed meal,
 Mix.

Divide into eight doses ; give one night and morning. When they are gone, wait a week and repeat it. Avoid giving too much, as it is apt to weaken the kidneys. Always drive a horse slowly that has the heaves.

X. Congestion of the Lungs.

Congestion, is always a precursor of inflammation of the lungs, but it sometimes comes on in such a way, as to need separate consideration. The pathology of it is turgescence of the lung tissue by stagnation of the capillary blood vessels and arterioles. Under favorable circumstances it improves, and total recovery is the result, but in bad cases it is very apt to run on to inflammation of the lung tissue, and a case of pneumonia is the result.



BAD POSITION.

For head of horse affected with heaves ; for it aggravates the difficult breathing.

Causes.—Over exertion when not in condition to take it ; the system is fat ; the blood is rich and fat ; the lung tissue is weak from want of use during longer or shorter periods of idleness. When in this condition, the horse is taken out, perhaps, once a week, and the driver thinks because he has had so long a rest, he ought to be able to go faster than if he were out every day, and sends him through to beat the crowd. Congestion of the lungs is quite frequently the result. This is oftener seen in the old country among the hunters, but is not infrequent in this country among the gentlemen's road horses. From the contraction of the muscular tissue, the blood is thrown inwardly to the lungs, liver and spleen ; the lung tissue becomes fatigued, and the small blood vessels surcharged with blood to such an extent as to interfere with the circulation.

How to know it.—The horse suddenly stops, all out of breath ; nostrils distended ; the countenance has a look of anxiety upon it ; he looks around as if in search for more air ; paws the ground in his endeavor to breathe, and acts generally as though suffocation were near.

What to do.—Let him stop ; turn his head towards the wind ; loosen all harness that interferes with the free expansion of the chest and passage of air to the chest ; let down the cheek rein ; loosen the throat lash ; remove the collar or breast plate and girth ; and a small stab of the knife in the roof of the mouth to draw a little blood may assist in restoring the circulation. As soon as he is sufficiently recovered, take him home quietly

and place him in a comfortable loose box ; give him a sponge bath with alcohol and plenty of friction from head to foot ; also cold water to drink in small quantities, and give recipe No. 30, in a little water, till the breathing and circulation are normal. If it does not yield to this treatment, and pneumonia is inevitable, adopt the treatment prescribed for that without delay, and apply it vigorously. Approaching pneumonia will be noticed by a rise in temperature. If the temperature goes above 101 ° Fahr. and the breathing continues labored, look out for pneumonia.

Prevention.—Feed a horse according to his work. If he is doing daily hard work there is very little danger of overfeeding, but if the work is light and little of it, feed sparingly on heavy grain. Give daily regular exercise. There is very much less danger of derangements if the horse goes out every day than if he only goes out once or twice a week, and he is able to do ten times the work from the fact that he is in a strong, vigorous condition—muscular without being fat.

XI. Pleurisy.

The lining of the chest and coverings of the lungs are serous membranes that secrete a serous, slippery moisture that prevents friction by rubbing of the lungs against the ribs—called the *pleura*. Inflammation of these serous membranes is known as pleurisy. It is attended with great pain, and is often followed by hydrothorax or filling of the chest with water, which is generally fatal. Pleurisy may exist alone or with pneumonia ; then it is called pleuro-pneumonia.

Causes.—Any sudden exposure to cold rains ; drafts in the stable, especially if the horse comes in warm. It would be very prevalent if the inflammation in these parts did not go to the feet by metastasis as often as it does. See founder or laminitis.

How to know it.—The horse has a chill, followed by high fever ; great pain in the chest, shown by colicky pains ; nose turned around towards the chest frequently ; ears and legs are cold ; breathing hurried ; pulse quick, from 50 to 75 per minute ; temperature raised three or four degrees ; elbows turned out, and a line along the lower edges of the ribs denoting a fixed position of them to prevent friction in the chest ; loss of appetite ; great pain evinced upon pressure with the fingers between the ribs ; a grating sound heard by the ear applied to the sides, made by the rubbing of the parts internally, which are rendered dry by the inflammation.

If recovery takes place, it is usually within four days ; but if it continues longer than that, effusion takes place, and the chest begins to fill with water, floating the lungs up and forming hydrothorax. If the chest does not fill more than one-third, it will usually absorb, and he will recover ; but if the chest fills more than one-third full, it is usually fatal.

What to do.—If seen during the chill, put on blankets ; shelter from the cold air, and give half a teacup of whiskey in a little water, and follow it with receipe No. 40, giving a dose every two hours till he is better ; set a pail of water before him, and feed lightly. Rub the liniment, No. 41, well in to the sides, and, after six hours, repeat it. When the fever is broken, change the prescription to No. 18. When convalescence is well established, give receipe No. 22.

XII. Hydrothorax.

Causes.—This is a filling of the chest with water, following pleurisy.

How to know it.—The horse has been enduring great pain all through the attack of active inflammation, but as soon as effusion begins, and the chest begins to fill with water, the pain is relieved ; he brightens up, commences to eat, and is more comfortable, till the water floats the lungs up and interferes with the breathing. Then the countenance becomes haggard and anxious ; breathing short and fast ; breath cold, from shallow, bronchial respiration ; the extremities are cold ; pulse very high, from 80 to 150 per minute ; tapping on the sides will produce the solid



CONGESTION OF LUNGS.

Fore limbs apart and well under body. Nostrils are flapping and the eye has a deadly stare.

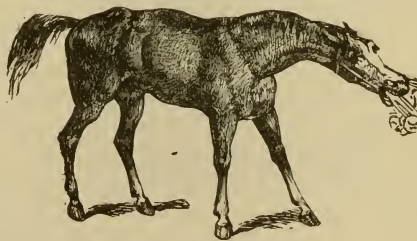
sound of a barrel full of water ; the ear placed to the side will fail to detect the customary respiratory murmur ; there will be lifting of the loins and elevation of the back at each effort at inspiration, that is, drawing breath in ; the ribs bulge outward ; dropsical swellings appear under the chest and belly ; the head is extended ; there is flapping of the nostrils ; regurgitation of the blood in the veins ; splashing of the water is heard in the chest when it reaches the heart ; the pulse gets smaller and smaller ; breath shorter and shorter, till he drops suffocated, as completely drowned as though he were pitched into the lake.

Favorable symptoms are lessening of the effusion in the chest; improvement in the breathing and pulse; return of healthy appetite, etc. But recovery is slow, and complete recovery is seldom realized, for the lung is apt to grow fast to the ribs, and stitches in the side attack him during active exercise.

What to do.—Put him in a comfortable place, dry, warm, and well-ventilated, but no drafts. Clothe warmly, and bandage the legs. If the sides have not been well blistered with receipt No. 41, apply it immediately, and repeat it every six hours, till the sides are well-blistered, and give No. 18 internally, every two hours, very persistently; if he eats nothing, drench him with oat-meal gruel. If the chest continues to fill it may be tapped, the operation being called *paracentesis thoracis*, directions for which may be found in the chapter on operations.

XIII. Chronic Cough.

Causes.—When the inflammation of the mucous membrane of either the larynx or bronchial tubes becomes chronic, the irritability of it remains and the smallest thing will produce a cough, and sometimes a fit of coughing that may last several minutes. Dust in the hay or oats, or breathed in while on the road, sudden gusts of air, pressure of the collar or throat lash, or pinching of the throat with the hand will excite the cough.



THE ACT OF COUGHING.

How to know it.—Coughs are efforts of nature to free the breathing apparatus of irritants, and they differ according to the part affected and the extent of the affection. The healthy cough is strong, full and usually followed by a sneeze to clear the nose. The throat cough is a lighter, shorter, hacking one, while that of the chest is a hollow, deep, resonant cough, except in the acute, painful stages of bronchitis, when it is almost noiseless from being so much subdued.

What to do.—Chronic cough is almost incurable when long standing, but in the more recent cases good treatment will benefit and oftentimes

cure. If the cough is recent, apply recipe No. 41 to the throat, well rubbed in all around and up towards the ears. Give internally the following powders :

- | | |
|---------|------------------------|
| No. 43. | 1½ Ounce gum camphor, |
| | 1 Ounce digitalis, |
| | 2 Ounces linseed meal, |
| | Powder and mix. |

Divide into twelve powders and give one night and morning in soft food. If one course does not cure, repeat it. If that proves ineffectual, apply blister No. 9 instead of No. 41, to the throat and give Prof. Dick's recipe as follows :

- | | |
|---------|---------------------------|
| No. 44. | 1 Drachm camphor, |
| | 1 Drachm digitalis, |
| | 1 Drachm calomel, |
| | 1 Drachm opium, |
| | Mix in a ball with syrup. |

Give it as one dose : repeat it once a day for a week, then rest a week and repeat.

If the cough is very troublesome and the appetite is poor, give the following :

- | | |
|---------|-------------------------------------|
| No. 45. | 2 Drachms diluted prussic acid, |
| | 1 Ounce tincture of camphor, |
| | 3 Drachms fluid extract belladonna, |
| | 1 Ounce tincture gentian. |
| | 1 Ounce chlorate of potash, |
| | Water to make one pint, |
| | Mix. |

Give one ounce three times a day, with a syringe ; open the mouth with one hand and shoot it well back into the throat. Do not attempt to hold a horse's head up to drench him with anything else than oil when he has a cough ; for it is apt to irritate the throat and might choke him.

For the treatment of coughs accompanying catarrh and laryngitis refer to them. If the above treatment fails, we would recommend the insertion of a seton under the skin of the throat and a long run at grass, if practicable. Leave the seton in three or four weeks ; wash it nice and clean once a day with hot water. Sometimes a run at grass will do more for a bad cough than all the medicine in the world.

If the cough appears to come from the chest, and pressure in the hollow just above the breast bone aggravates it, apply the blisters there, and give the same treatment otherwise as for the throat.



A SETON IN THE THROAT OF A HORSE.

CHAPTER X.

DISEASES AND ACCIDENTS OF THE ALIMENTARY CANAL.

- I. TEETH—ACHE, DECAY, FILING—WOLF TEETH.—II. TONGUE LACERATION.—III. SORE MOUTH.—IV. LAMPAS.—V. PHARYNGITIS.—VI. CHOKING.—VII. GASTRITIS.—VIII. STOMACH STAGGERS.—IX. DYSPESIA.—X. SPASMODIC COLIC.—XI. FLATULENT COLIC.—XII. RUPTURE OF THE STOMACH, INTESTINES OR DIAPHRAGM.—XIII. CONSTIPATION.—XIV. DIARRHOEA AND SUPERPURGATION.—XV. DYSENTERY.—XVI.—ENTERITIS.—XVII. PERITONITIS.—XVIII. CALCULI.—XIX. INTUSSUSCEPTION AND GUT TIE.

I. Teeth—Ache, Decay, Filing—Wolf Teeth.

Causes.—Derangements of the teeth very frequently lead to grave difficulties, both local and constitutional. The teeth often become decayed, holes form in them, and tooth-ache is a common occurrence.

How to know it.—It will be detected by the horse holding his head on one side while chewing, turning his head first one way then the other,



A HORSE WITH TOOTHACHE.

as if trying to remove food from a sore tooth, and doing the same when drinking, if the water is very cold. The disease often extends up the tooth, or starts in the form of ulceration on the fang, and breaks out into the nose, causing a discharge from the nostril on the side on which the rotten tooth is located. A chronic discharge from a tooth is often mistaken for nasal gleet, and sometimes for glanders, on account of the

disagreeable odor, which will be recognized as that characteristic of diseased bone.

Sometimes the ulceration, when of a lower tooth, breaks out at the angle of the lower jaw, and sometimes extends to the root of the tongue and to all the soft tissues between the branches of the lower jaw; in one instance that came under the notice of the writer, the disease proved fatal to a valuable horse.

The teeth frequently get broken by chewing on stones taken up with oats, and when one molar tooth gets broken off, the opposite tooth, not having anything to wear against, gets very long and sticks into the opposite gum, and makes mastication very painful. The edges of the molar teeth get sharp from the fact that they wear bevelling—the edges must necessarily sharpen as they wear; the upper rows bevel downwards and outwards, the edges cutting the cheeks, and the lower rows bevel upwards and inwards, cutting the tongue.

The broken and sharp teeth make mastication not only painful, but almost impossible, consequently the horse bolts the food half chewed, which causes indigestion, colic, dyspepsia, hidebound, emaciation, etc., any of which may run on to a fatal termination. The food is frequently quidded and dropped into the manger.



A HORSE QUIDDING.

Colts, when shedding their teeth, often suffer a great deal from sore mouths, which causes them to look rough and scaly until the old teeth are shed, and new ones grow.

What to do.—In case of a discharge from the nose, always examine the teeth, and if any are decayed so as to cause the trouble, remove them. If a tooth extends below the others on account of the opposite one being broken, file it off even with the others. If the edges get sharp, so as to scarify the cheeks and tongue, file them off round. There are files made expressly for that purpose. The edges only need filing; the surfaces get very rough, but that is intended to be so by nature; it is her millstone to grind the grain; and the arrangement of the tooth material is such that the more it wears the sharper it gets.

In case of a parrot mouth, where the upper incisors project over the lower ones, the horse is unable to graze, and the mouth, as far as age is concerned, presents a horrible appearance, passing for double the age he really is. Either file or saw them off even with the lower row.



PARROT MOUTH.

Wolf Teeth.—These are small, insignificant teeth, that come immediately in front of the upper rows of molars. It is a popular idea that these affect the nerve running to the eye and cause moon-blindness, weak eyes, etc. But it is a whim; they do no possible harm, except, perhaps, to wound the cheek by its being pulled against the wolf tooth by the bit. But they do no possible good, and, consequently are just as well, and a little better, out. Take a pair of blacksmith's pinchers and pull them out. They are usually only in the gums, and come out easily. When the new teeth of colts come before the old ones are out, the old ones should be removed, to make room for the new.

II. Tongue Laceration.

Causes.—The tongue is sometimes bitten by falling and striking on the mouth; torn with the halter chain, or by being pulled forcibly out of the mouth on one side, being cut against the sharp molar teeth.

What to do.—Wounds on the tongue heal readily. If the end is torn half-way off, or less, it will heal, but will not grow together, but may be left, and no inconvenience will be felt; but if it is more than half torn off, it will be found advisable to cut it clear off. Dress wounds of the tongue with the following lotion:

No. 46. 1 Ounce borax,
 1 Ounce honey,
 1 Pint water,
 Mix.

Dry the sore with a sponge, and rub on the lotion three times a day.

Sometimes it is necessary to amputate the tongue, on account of wounds and accidents. It is quite feasible, but requires the skill of a qualified veterinary surgeon.

III. Sore Mouth.

Causes.—The mouth is often made sore by the bit, by caustic substances in the food and medicine, by too hot mash, etc. The bit often excoriates the angles of the mouth, and, if allowed to continue doing harm, the mouth soon becomes caloused, and loses all sensibility. Sometimes the bit injures the lower jaw bone so as to kill a portion of it, when it will become a foreign substance and slough out, leaving a very sore mouth.



SORE MOUTH.

With the angles excoriated by the bit.



SORE MOUTH.

With the angles and cheeks swollen, caloused and insensitive.

This is most often seen in violent pullers and when the curb bit is used. The oval portion of a curb bit often presses upon the roof of the mouth and does a great amount of injury.



INJURY BY THE BIT.

A mouth with the bone badly injured by the bit, the left side being much swollen around the tusk.

How to know it.—When any portion of the mouth is swollen and sore, examine it carefully and locate the cause if possible. When the bones or roof of the mouth are injured, there will be great soreness and some swelling.

What to do.—Remove the cause, that is, leave the bit out of the mouth for several days. If



MISUSE OF CURB.

The roof of the mouth injured by the curved part of the curb bit.

the angles of the mouth are raw, apply recipe No. 32 three times a day. If the bones are injured and exposed apply No. 39 three times a day;

if the flesh is not broken it would be advisable to scarify it to allow it to break through the tough skin more easily, and examine it carefully each day to see when the dead piece of bone is loose, and remove it. Then dress the wound with the same lotion, (No 39) till the bone is covered by healthy granulations, then dress it with No. 46. Do not use the bit in such a mouth under two months at least.



SCALDED MOUTH.

When the mouth is scalded by giving strong medicine, pure, instead of diluting it as directed on the label, the whole inside of the mouth will be found to be swollen, red, and if very bad, will skin in spots. Swab it out with recipe No. 46 three times a day.

From giving strong caustic medicine pure.

IV. Lampas.

This is an imaginary disease. It is supposed by most people that when a horse does not eat he must have the lampas, and they proceed to



BURNING FOR LAMPAS.



LAMPAS IRON.

The old time instrument of torture.

burn out one or two of the bars in the roof of the mouth which are placed there by nature to prevent the food dribbling from the mouth, which it would do were it not for these bars in the roof of the mouth. They all point or turn backwards towards the throat, and have a tendency to work the food back. It is the same in the human mouth.

Sometimes the one or two bars nearest the incisors become inflamed, especially with colts when teething.

What to do.—If the bars are red instead of a bright flesh color, and extend below the teeth, take a pen knife and scarify them gently; this will be sufficient. Never countenance the burning nor any other barbarous practice.

V. Pharyngitis.

That portion of the œsophagus or gullet that lies in the throat, above the larynx is called the pharynx. Inflammation of it is pharyngitis.

Causes.—It is usually caused by some foreign substance lodging there or by extension to the pharynx of inflammation from the larynx and nasal chambers. It is usually associated with pharyngitis and catarrh, strangles, quinsy, etc.

How to know it.—Painful swallowing, and sometimes a total inability to swallow is seen; the water returns by the nose while drinking, and the food is quitted. More or less enlargement of the throat and glands on the outside, tenderness upon pressure, and the neck straightened and the head extended, will be the symptoms usually noticed.

What to do.—If any foreign substance is suspected, examine the throat and remove anything that may be found. Apply a counter irritant in the form of the recipe No. 41. Give internally, mixture No. 21. Feed on soft feed, such as scalded oats, boiled barley, bran mashes, etc. If it continues longer than a week, give oat meal gruel injections—two quarts every four or five hours. Cook the gruel the same as for the table.

VI. Choking.

Causes.—Horses very seldom get choked; but in some instances they bolt their food, especially when fed on dry ground feed, and swallow it before it is properly moistened with saliva, and it accumulates in the gullet sometimes as large as your double fist, usually about six or eight inches from the throat. It often gives rise to a great amount of flatulence. Sometimes it leaves a sac in the gullet, from the distension of the fibres of its walls; the sac is called *dilatation of the œsophagus*.



CHOKING.

A horse trying to raise the food stuck in the throat from a stricture in the gullet.

What to do.—Give the horse a couple of swallows of raw lindseed oil, and manipulate the lump, and try and pass it on a little at a time, till it is all worked down; if this proves ineffectual, the probang must be used, but great care and caution are necessary not to keep it in too long, and not to push it through the walls of the gullet. A horse cannot breathe with the probang in his throat, therefore it is dangerous to leave it in longer than one minute at a time. If the obstruction is near enough to the throat, so it can be reached with the hand, run your arm down and remove it. As a last resort, when all other means have been exhausted,

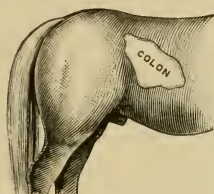


TWO FORMS OF PROBANG

The probang with a piece of sponge on the end is far the best.

cut down upon the substance and remove it. Make the opening in the skin large enough to get a hand in, but make the hole in the gullet as small as possible, just large enough to get one finger in, and break down the obstruction.

Cut carefully so as not to wound the jugular vein. Draw the edges of the gullet together with either catgut or silk, and dress it twice a day with lotion No. 39. Sew the skin with silk, and after dressing the wound with the above lotion, saturate a wad of oakum with the lotion and tie it over the wound. Keep the horse on very sloppy food, and very little of it,



WHERE TO TAP FOR STOMACH STAGGERS.



CEREBRO SPINAL MENINGITIS.
Horse is Delirious and Partially Paralyzed.

mostly oatmeal gruel, until the wound in the gullet is healed. Avoid making the opening if possible, for it is very hard indeed at all times, and sometimes utterly impossible, to make it heal, and a fatal termination is often the result.

VII. Gastritis.

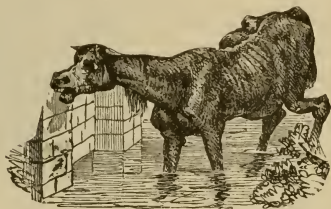
Causes.—This is inflammation of the stomach, caused by over-eating at any one time, getting into a clover field or at an oat bin or corn crib. Eating poisonous herbs or accidentally eating poison also causes it. The



MOVEMENTS IN INFLAMMATION OF THE BOWELS.
Horse gets up and down slowly and hesitatingly. Often mistaken for colic.

disease has a tendency to leave the stomach and go to the feet and cause founder. On account of this tendency we seldom have occasion to treat gastritis.

How to know it.—There is a tendency to wind colic, the food not being digested rapidly enough, decomposition sets in and leads to flatulence. There is usually a loss of appetite, and sometimes symptoms of nausea, such as turning up the nose.



CHRONIC GASTRITIS.

A horse quenching the excessive thirst of chronic gastritis.

What to do.—Give a complete change of food ; if corn and oats have been fed, change to bran, carrots and boiled barley, and if in season, give green food. Give raw linseed oil in half pint doses once a day till the bowels are quite soft, and feed a little oil-cake meal, a pint once a day. If wind accumulates after eating, give the following as a drench :

- No. 47.
- | |
|------------------------------------|
| 1 Teaspoonful bicarbonate of soda, |
| 1 Ounce extract of ginger, |
| $\frac{1}{2}$ Pint water, |
| Mix and give as one dose. |

If thirst is excessive, give half an ounce of chlorate in the water, well dissolved, twice a day. This excessive thirst is often seen as a symptom of the disease when it has become chronic.

VIII. Stomach Staggers.

This is a sleepy, dumpish, stupid condition resulting from engorgement, and through the nerves the impression is carried to the brain, and stupor is the effect.

Causes.—It frequently happens after over-eating on clover, or the horse gets into the garden and fills up on cabbages or roots of any kind.

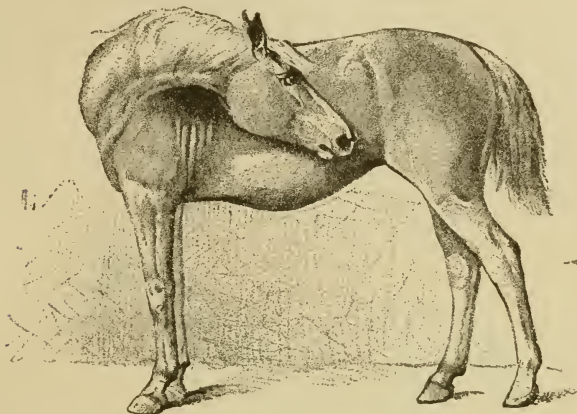
How to know it.—The horse is usually found standing in a stupid manner as though asleep, perfectly quiet, and perhaps with his mouth full of food ; he is oblivious to all around ; place one foot across the other, and he will leave it so ; prick him and he may wake up for an instant, but subsides again as quickly.

What to do.—Put him in a safe place: remove all food; give him very little water, and give a dose of purgative medicine as follows:

No. 48.

6 Drachms barbadoes aloes,
1 Pint raw linseed oil,
Mix.

Give as one dose. As soon as he is sufficiently recovered give him walking exercise. If the purgative does not work in the course of twenty-



HORSE AFFECTED WITH PAINFUL SUFFERING OF THE HIND QUARTERS

four hours, give injections of warm water and soft soap every hour till purgation is obtained.

Prevention.—Avoid engorgement; feed on bulky food.

IX. Dyspepsia.

Causes.—This is rather uncommon, but is occasionally seen in horses that have been fed artificially for any great length of time especially if highly fed.

How to know it.—There will be a general unthrifty appearance to the horse; he will be thin; coat rough and staring, hide bound; and the surest symptom of all is the yellowish color and offensive smell of the manure. After a while the appetite wanes; he gets hungry, and will rush at the food as though he would swallow the whole at once, eats a few mouthfuls and leaves the rest; perhaps he will nibble a little more, but will not eat as though he relished it. He gradually grows worse, till he becomes a mere skeleton.

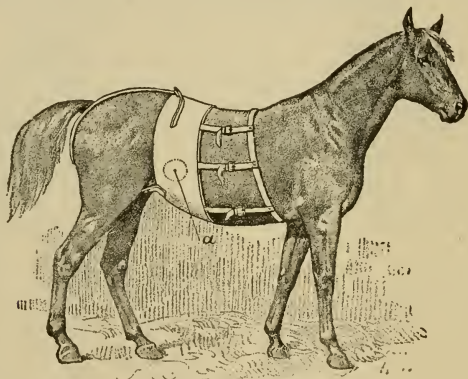
What to do.—If practicable, give him three or four months at grass; first examine his teeth, and remedy any defect. If it is not the right

time of year to turn out to grass, give a complete change of food · carrots, turnips, apples, boiled barley, scalded oats, and bran mash. Feed no corn at all. Give a dose of purgative medicine, recipe No. 23. When the purgation is all over, give the tonic No. 34, in soft feed. If the appetite is poor, so that he won't eat the powder, give No. 35. Continue it a week, then stop a week, and repeat.

X. Spasmodic Colic.

The term colic, means pain in the colon, (one of the large intestines), but is accepted as the name for all pain in the abdomen. It is often called belly-ache. It is always very serious, indeed, for two reasons—it is terribly painful, and is very apt to run into inflammation of the bowels, which is usually fatal.

Spasmodic colic is pain in the bowels, from the violent, spasmodic contraction and cramp of the muscular coat of the bowels. It is called spasmodic on account of the pain and cramps being spasmodic and not contin-



A RUPTURE BANDAGE.

(a) Spot where a skewer has been inserted which holds back the rupture.

uous; there are moments of relief from the pain, in which the animal will be quite at his ease, but it is apt to come on again after a few moments.

Some horses are particularly subject to colic, owing to a ravenous manner of eating and drinking, consequently they have it from time to time, and usually die with it after a few repetitions.

Causes.—It is caused by some irritant in the bowels—indigestible matter; also by large draughts of cold water, particularly if the horse is warm. Colicky pains are very often symptoms of other diseases.

How to know it.—In the first stage, the horse will begin to be uneasy; looks around; raises up his hind feet towards his belly; steps around from one side of the stall to the other; stops eating; will curl as if to lie down

In the second stage, he lies down and gets up again after lying, perhaps, a couple of minutes; in the third stage, he rolls, kicks, sweats profusely, has a haggard countenance, is inclined to turn upon his back, and remains so. In mild cases, after kicking for half an hour or so, the



SECOND STAGE OF SPASMODIC COLIC.

horse usually gets better, the pain all passes off, and he returns to his accustomed spirits and habits; but if it does not go off in the course of half an hour, and from that to two or three hours, it is apt to run into enteritis, and kill him.

What to do.—Give mild, diffusible stimulants, as early and quickly as possible. Give either of the following:

- No. 49. 2 Ounce whiskey,
 1 Ounces extract of ginger,
 $\frac{1}{2}$ Pint water,
 Mix.

Give as one dose. Or this:

- No. 50. $1\frac{1}{2}$ Ounce sweet spirits of nitre,
 1 Ounce laudanum,
 $\frac{1}{2}$ Ounce extract of ginger,
 $\frac{1}{2}$ Pint water,
 Mix.

Give as one dose. Always, when possible, give warm water injections with a very little soap in it, just to make it a little slippery. Give the horse a soft, roomy place to roll in, and if he has the colic at all bad, give a couple of days rest afterwards, feeding on soft food. Give the abdomen friction, and put on a blanket to avoid his cooling off too soon.

When the worst part of the pain is over, a little walking exercise will be beneficial. If after giving the first dose the pain continues more than

half an hour, repeat it every half hour till relief is obtained; but if it does not yield with three or four doses, give the following:

No. 51. 1 Quart raw linseed oil,
 ½ Ounce chloroform,
 Mix

Give as one dose. In half an hour, if the pain is continuous, give

No. 52. 4 Grains sulphate of morphia,
 ½ Ounce water
 Mix.

Give as one dose with a syringe. Repeat it every half hour if necessary to keep him quiet. If this does not effect a cure, refer to treatment for enteritis, for it certainly has run into inflammation of the bowels.

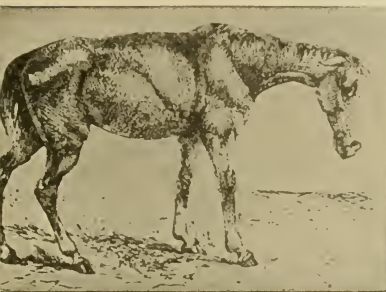


THIRD STAGE OF SPASMODIC COLIC.

XI. Flatulent Colic.

Causes.—The nature of this disease is acute indigestion. Either weak digestion, or a suspension of digestion entirely, allows the undigested food to decompose, and while undergoing that process, fermentation sets up, gas is evolved, and the horse bloats up, sometimes to an alarming extent, even to cause death by suffocation or rupture of the stomach, intestines or diaphragm. It is most common where corn is fed freely, and is apt to come on when the horse is taken out to work or drive immediately after eating. The active exercise retards or wholly interrupts digestion, and the moment digestion stops, decomposition sets in and the evolution of gas begins. It is very weakening and often fatal. It usually lasts about two to four hours, but sometimes lingers for ten or twelve, and sometimes proves fatal in half or three-quarters of an hour.

How to know it.—The characteristic symptom is the bloating with gas, and there is always a great amount of pain. The horse rolls, kicks, paws, tries to lie on his back, gets up and down, sweats tremendously, has a haggard look in his face, gulps wind and food from the stomach in small quantities through his nose; and the food thus discharged is usually green and very sour. The nostrils are distended, breathing rapid and breath cold from the shallow breathing; the pulse is quickened at the start, but gradually grows harder and smaller as the fatal termination approaches; the belly becomes so distended that the flanks are above the points of the hips; and in some cases, when lying down, the legs are so spread from the distension of the belly that the animal is unable to get up. If it lasts very long, the nervous system becomes exhausted; the



FLATULANT COLIC—FIRST STAGE.



FLATULANT COLIC, RUPTURED
OR LAST STAGE.

muscles around the chest, shoulders and neck cramp and draw down so as to almost pull the horse to the ground, and he will sometimes scream out like a child from the pain. The ears and extremities get deathly cold.

If rupture takes place, he will sit on his haunches like a dog, turn up his upper lip as though nauseated and try to vomit; but owing to the peculiar formation of the stomach the horse cannot vomit. The pulse gets weaker and smaller till he falls and dies from nervous exhaustion. When he dies in earlier stages, it is from suffocation; the distension of the stomach and bowels presses on the lungs so hard that it forces them up into so small a compass that they cannot work, and suffocation is the result.

Favorable symptoms are cessation of pain ; free evacuation of gas per rectum ; pulse returns to its normal condition ; ears and extremities regain their natural temperature ; sweating stops, and the horse returns to his feed and customary habits.

What to do.—As soon as it is discovered, give the following :

- | | |
|---------|---|
| No. 53. | 1 Tablespoonful bicarbonate soda (saleratus), |
| | 1 Teacupful water, |
| | Mix. |

Give as one dose, and repeat it, if necessary, in ten minutes.

Give warm water injections, being careful not to push the nozzle of the syringe through a gut ; for the intestines crowd backward so hard that it is very difficult to give injection enough to amount to anything, although it is best to try. If the soda does no good, give the following :

- | | |
|---------|-------------------------------------|
| No. 54. | 1 Ounce turpentine, |
| | $\frac{1}{2}$ Pint raw linseed oil, |
| | 1 Ounce landanum, |
| | Mix. |

Give as one dose, and repeat it in fifteen minutes, if necessary. If this proves ineffectual, give

- | | |
|---------|-------------------------|
| No. 55. | 1 Ounce chloroform, |
| | 1 Pint raw linseed oil, |
| | Mix. |

Give as one dose, and repeat, if necessary, in half an hour.

Bind hot water rags to the belly, and keep them hot.

As a last resort, if the flatulence does not yield to the above treatment, the trocar and cannula may be used. Let it be a small one, not over one



TROCHAR PROVIDED WITH
CANNULA FOR PUNCTUR-
ING THE ABDOMEN.

quarter inch in diameter and three inches long ; find the center of a triangle formed by the last rib, point of the hip, and the edges nearest the flank of the spines in the loins ; clip off the hair, and pass the trocar in slowly and firmly, pointing it in and down at the same time, so as to avoid wounding the kidney ; leave the cannula in there, but draw out the trocar, and, if the gut that is distended is tapped, the gas will rush out. Sometimes fecal matter will clog the cannula ; if so, pass in a small piece of whalebone, or other probe, to remove it from the lower end. If no gut is tapped, try the same operation on the other side. It makes no difference which side is tapped, for there is no paunch adherent to the side of horses, as in cattle. The treatment by the mouth may be kept up while this is done.

When they drop from suffocation, or when ruprure takes place, it is too late to do anything ; but, in every case, persevere till either one or the other of these tells you further effort is useless.

XII. Rupture of the Stomach, Intestines or Diaphragm.

Causes.—This occurs in violent cases of flatulence. When the generation of gas is excessive in the stomach or the intestines, they are liable to rupture, and let the food out into the abdominal cavity, or from the



UNNATURAL ATTITUDE INDICATIVE OF ABDOMINAL INJURY.

tremendous pressure against the diaphragm, it is liable to rupture and let the intestines into the chest among the lungs and heart. Either case is fatal, the animal dying from shock to the nervous system, hemorrhage and suffocation.

How to know it.—The horse will sit on his haunches; but this is not a characteristic symptom of itself, for we see it occasionally in spasmodic colic, and often in enteritis; the horse will turn up his nose with an intensely disgusted expression on his countenance, but this, too, is often seen in colic and enteritis; he will try to vomit, which is a characteristic symptom, and the muscles and legs will tremble and shake as if with cold; the ears and legs get cold; cold sweat breaks out in patches; the mouth gets cold, the pulse grows smaller and smaller, till it becomes imperceptible, and death claims the patient in the course of half an hour to two hours.



NOSE STRAINED UPWARD.

XIII. Constipation.

When the fecal matter in the intestines gets dry and hard, and resists the peristaltic effort of the bowels to pass it on, or when there is no peristaltic motion to the bowel, and the food lies quiet in one spot, there is

an obstruction to all intents and purposes, which is called constipation, or costiveness.

Causes.—When the food dries and hardens so that it cannot be passed on, it is due to an insufficient quantity of water in the bowel, owing to its all going to the kidneys, or it is due to the horse not drinking enough, or to inactivity of the liver and other glands that supply the bowels with juices. When it is from a want of peristaltic motion, it is due to nervous weakness in the bowels.

How to know it.—Little or no fœtal matter is passed; what is passed is hard and dry; mild colicky pains are felt at intervals of half an hour or so. The horse may continue to eat and otherwise appear all right, but as it runs on, the pains will come oftener and be more acute till it runs into enteritis.

What to do.—If the pulse is natural and the colicky pains slight and far between, give recipe No. 23; also give warm water and soap injections. If the pains continue and increase, give a quart of raw oil and recipe No. 52. If it does not yield to this, give the following:

No. 56.	1 Quart raw oil, 1 Ounce tincture nux vomica, Mix.
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Give as one dose. Repeat recipe No. 52 often enough to keep down the pain. If the pain seems to be increasing and the constipation obstinate, apply to the belly, well rubbed in, the following:

No. 57.	1 Ounce croton oil, 3 Ounces raw linseed oil, Mix.
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Repeat recipe No. 56 every six hours till a passage is effected. Repeat the injections once an hour, but put in less soap each time. If it is necessary to repeat them more than four or five times, use clear water without soap.

XIV. Diarrhœa and Superpurgation.

These are watery evacuations from the bowels, and are the opposite to constipation.

Causes.—In diarrhœa there is an excessive secretion of the juices of the system, owing usually to some irritant in the bowels, but sometimes to too laxative food. Superpurgation is due to an overdose of purgative medicine.

How to know it.—The evacuations are frequent and watery; after running a while the bowels become irritable and the patient strains a good deal and becomes weak; the pulse gets feeble; the mouth clammy; the ears and extremities cold; the eyes and nose pale; the horse grinds his

teeth, and refuses food; thirst is excessive. The temperature of the body taken with the thermometer is down, perhaps to 95° Fahr. If it goes down to 93°, the disease is almost sure to terminate fatally.

What to do.—If it is a straight case of diarrhœa—that is, without any purgative having been given—give a complete change of food and the following:

No. 58.	1 Ounce prepared chalk,
	1 Ounce ginger,
	1 Drachm opium,
	1 Pint starch gruel,
	Mix.

Give as one dose, and repeat it, if necessary, after three or four hours. Give him water with flour stirred in to drink, but restrict the quantity to about two quarts every three or four hours. If this does not stop it after giving two or three doses of the medicine, give the following:

No. 59.	$\frac{1}{2}$ Pint raw linseed oil,
	1 Drachm opium,
	1 Ounce tincture catechu,
	Mix.

Give as one dose. If superpurgation is the trouble, give the flour and water to drink. If this does not check it in five or six hours, give in addition:

No. 60.	1 Ounce tincture catechu,
	$\frac{1}{2}$ Ounce tincture camphor,
	1 Ounce tincture opium,
	1 Quart starch gruel,
	Mix.

Give as one dose. Repeat it if necessary every four hours. Restrict the drinking a little, and feed lightly when the appetite returns.

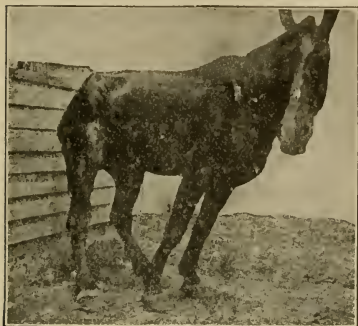
XV. Dysentery.

The nature of this disease is bloody evacuations with great straining. There is inflammation of the mucous membrane of the large intestines, with more or less fever and great irritability of the intestinal tract.

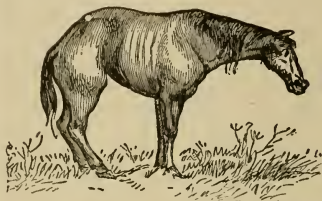
Causes.—Neglected diarrhœa and superpurgation; too acid a condition of the bowels; impure, indigestible and musty food; and foul atmosphere.

How to know it.—By the bloody evacuations; severe, frequent and ineffectual attempts to pass fecal matter; colicky pains; considerable fever; great thirst; no appetite; pulse quick, weak and compressible. It is rather rare in the horse; when it does exist, worms are often found, too, and are thought by some to assist in the cause of it.

What to do. Give recipe No. 59, and give injections of starch with one ounce of laudanum in each injection; repeat the latter every half



IMPACTION OF LARGE BOWEL.



A SUFFERER FROM CONSTIPATION. The tucked-up belly, the attitude, and general expression of suffering are plainly shown.

hour. In one hour after taking No. 59 give No. 58, and in another hour, if the straining continues, give No. 60, and the following injection :

- No. 61. 1 Ounce tincture of opium,
 1 Ounce sulphuric ether,
 1 Quart starch,
 Mix.

If no improvement takes place in the course of ten hours, give a pint of raw oil and repeat the injection every half hour.

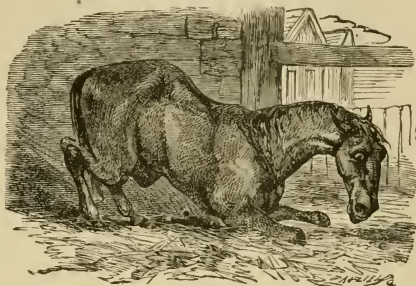
XVI. Enteritis.

Inflammation of the bowels takes two forms, according to the part affected. Enteritis is inflammation of the mucous lining of the bowel; the next subject, peritonitis, is inflammation of the outer or serous covering of the bowel.

Causes.—Irritating substances in the food; catching cold which settles in the bowels, continuation of colic, either spasmodic or flatulent; and poison.

How to know it.—There is continuous pain, light at first, and increasing as the inflammation develops. It is different from colic, for which it might be taken by an ordinary observer, in that it is continuous, while colic is intermittent; in colic, the horse throws himself down; in enteritis he lies down carefully; the pulse is raised to seventy-five or eighty, or even a hundred

beats to the minute ; the countenance wears an anxious look ; he is very uneasy ; when not getting up and down he is turning around ; if in a box stall, he looks around to his sides, paws, raises his legs up towards the body ; the breathing is hurried ; there is profuse sweating ; the pulse is soft at first, but grows gradually harder, faster, and at last it gets wiry, and finally imperceptible ; the extremities get cold, and the horse wears himself out



POSITION ASSUMED BY HORSE SUFFERING FROM ABDOMINAL INJURY.

with the pain and constant moving about. Towards the last, the pain will apparently abate a little ; he will stand quiet for a while ; brace his legs till he cannot resist any longer, and will reel and drop, the hind end first, generally. He dies in the course of eight to twenty hours after the first symptom, but in some instances the horse will die in six hours after the very first symptom. Sometimes they get perfectly crazy with the pain, and they will rear, run, climb over anything, tear down the stalls, etc. They can bear no pressure on the belly without pain.

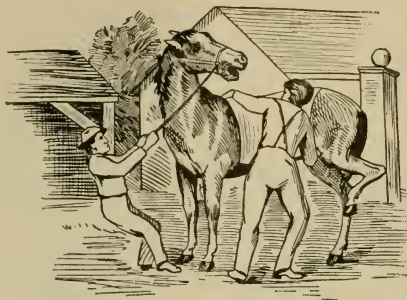


ENTERITIS.

A test for enteritis, the mouth usually being found hot and dry.

What to do.—Treatment is of very little use, for a genuine case of enteritis is always incurable, but it is best to try always. At first, it is usually taken for colic, and the prescribed drenches are given for that disease ; but when you notice the pain is continuous and the pulse runs up, it is sufficient evidence to locate the trouble as inflammation of the lining of the large intestines ; then give No. 56, and apply a mustard paste to the belly. After it has been on an hour, wash it off and repeat it, or apply No. 41, and confine the fumes with a blanket. A few minutes after giving the oil, give No. 52 ; repeat the latter every half hour, if necessary to keep him easy. Give No. 30, continuously, in addition to the others. Also give injections of soap and

water. If the pulse continues to quicken and get hard, repeat the oil every two or three hours, and apply No. 57 to the belly where the mus-

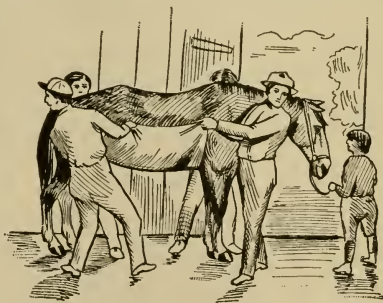


ANOTHER TEST FOR ENTERITIS.

A horse manifesting tenderness upon pressure on the belly in enteritis.

tard was. If the oil works through, there is a chance of success; then just let the horse remain perfectly quiet for several days, give oat-meal gruel to drink.

Post mortem examination shows the bowel affected to be almost black from congestion, inflammation, and mortification. The disease usually



APPLICATION OF AN AMMONIACAL BLISTER.

confines itself to about a yard of the gut. The tissue of the intestine will be swollen sometimes over an inch thick.

XVII. Peritonitis.

This is inflammation of the outer covering of the bowel; it is less rapid in its course, and less painful. It may last a week or so, or it may kill in ten or twelve hours.

Causes.—Wounds in the abdominal cavity, exposure to cold storms, kicks in the belly, etc.

How to know it.—The pulse is quick—from sixty to seventy-five, and is hard and wiry; the horse lies down very easy, but gets up quick; loss of appetite. When the inflammation does not kill, effusion of water takes place into the belly, giving the horse the appearance of dropsy by the large abdomen. There is great pain upon pressure on the abdomen.

Post mortem examination reveals extensive discoloration of the bowels and surrounding tissue. A great quantity of bloody matter is floating in the cavity. The inflamed portion of the intestines is very much swollen.

What to do.—Give No. 56 as soon as the nature of the disease is recognized. Give No. 52 occasionally to allay the pain, and apply No. 57 to the belly. Give No. 30. continuously for several doses, till the pulse is improved. In case the abdomen fills with water, it may be tapped by passing in the trocar and cannula—the smallest size—through the centre of the belly, and through the hard, fibrous band running down the center. It is called *paracentesis abdomenis*, and should be performed by experts only.

XVIII. Calculi.

Intestinal calculi are not very common, although they are occasionally met with. It is very probable, that if all the cases of death from bowel troubles were examined *post mortem*, calculi would be quite often found, as that is the only way their presence can be determined.

Causes.—These stones are formed of calcareous material laid on in layers, and are usually found enveloping a nucleus of some kind—a piece of a nail, or a pebble, or a wad of hair, etc. They sometimes attain to enormous sizes and weight, and are usually round or oval. These stones are most common in sections of the country where hard well water is used for drinking, especially in lime districts.

Dust balls are common in horses that are fed on mill-sweepings; the dust accumulates around oat hulls or chaff from other grain. As many as a dozen have been found in one horse after death.

Calculi are seldom or never passed in a natural way, but make sacks in the bowel, and lie there till by accident they are dislodged and roll out into the passage, and form an obstruction, cause a stoppage, inflammation and death.

How to know it.—In addition to the symptoms of enteritis, the patient will frequently sit on his haunches like a dog. This is not a characteristic symptom, but in cases where calculi have been found, it was a prominent symptom.

What to do.—Nothing more can be done than to treat the symptoms, which are those of enteritis. Back raking is advisable, but it is not

among the probabilities that the stones would be near enough to the rectum, to be reached by the hand.

XIX. Intussusception and Gut Tie.

This is the slipping of a part of a gut into another part, like turning a finger of a glove partly wrong side out. It is rather uncommon. A case was lately seen by the writer, in which the blind end of the *cæcum* was turned into the other part, the fold coming at the intersection of the small intestines.

Causes.—The cause of intussusception is purely accidental.

How to know it.—There are signs of bowel trouble; colicky pains that come on gradually; the horse looks around; paws; stretches at full length, which is a tolerably characteristic symptom; gets up and down; the pulse rises and has a tendency to become hard and wiry; legs and ears get cold; patches of cold sweat break out over the body; the pulse gets smaller and harder; the muscles tremble, and death soon follows, which is caused by strangulation of the gut and mortification of the part affected.

Post mortem examination shows great swelling of the gut, sometimes to an inch thick, and the mortified portion will be black.

What to do.—As soon as any rise or change in the pulse is detected, especially if there is stretching and colicky pains, give recipe No. 56, hot water injections, and hot water rugs to the belly. If this does not give relief in an hour, give No. 55, and repeat it every two hours till relief is got; in between these doses, if necessary to keep down the pain, give No. 52. In some cases the intestines will return to their proper place, and their functions go on naturally again, but in some cases all efforts are unavailing, and death takes place in from ten to thirty hours.

Gut Tie.—This is similar in effect; the bowel gets into a half knot and strangulation follows the same as in intussusception.

Gut Twist—This is a twisting of a gut by turning partly over. If it does not right itself, strangulation and death are the inevitable result.

CHAPTER XI.

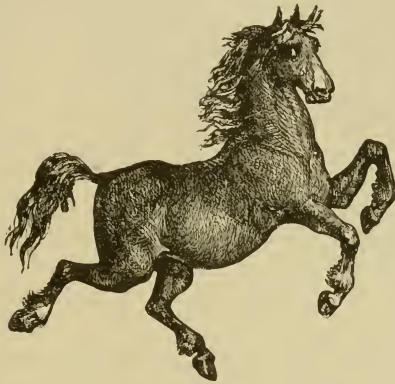
DISEASES OF THE BRAIN AND NERVOUS SYSTEM.

- I. PHRENITIS OR INFLAMMATION OF THE BRAIN.—II. CEREBRO-SPINAL MENINGITIS.
—III. APOPLEXY.—IV. MEGGRIMS.—V. TETANUS OR LOCKJAW.—VI.
PARALYSIS. VII.—SUNSTROKE.

I. Phrenitis or Inflammation of the Brain.

All the highly developed nervous systems—those of man, the dog and the horse—are more subject to disease than the quieter, and less developed nervous organizations of the ox, sheep, pig, etc.

Inflammation of the brain, sunstroke, tetanus and paralysis are quite common in the first mentioned animals and very rarely met with in the last.



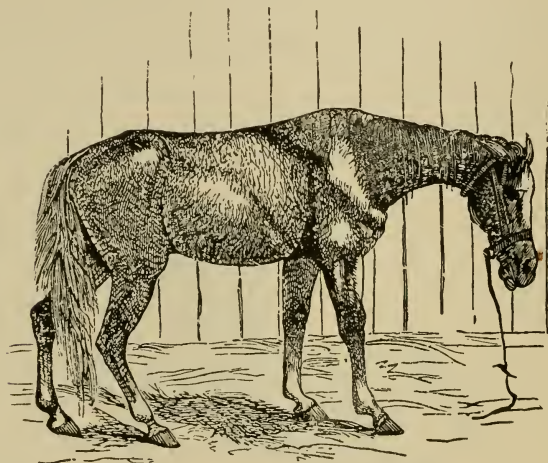
INFLAMMATION OF THE BRAIN.

Sample of the antics of a horse during the delirium of brain fever.

Causes.—The causes of phrenitis are various, such as concussion of the brain; exposure to cold, wet storms; extension of fever from the body; and sometimes the cause is not apparent.

How to know it.—There is a quick pulse; great prostration; respirations are quick, bowels constipated; visible mucous membranes are very

red; delirium at first, but soon runs into stupidity; the horse places his head against the wall and pushes and braces himself against it, and always bruises his eyes and head badly; he will eat occasionally, and will doze off into a fit of stupor with his mouth full and let the food drop; when roused he will paw and move around, hang his head against the wall and then doze off again. These symptoms may continue for several days, the mad fits coming oftener and more violently each time till death takes place, or he may die in forty-eight hours. Animals thus affected sometimes recover, but not very often, and when they do they are not safe; they are liable to another attack at any time, from the most trivial cause.



AN ADVANCED STAGE OF FLATULENT COLIC OR TYMPANITES.

fits may come on while in the street, the disease assuming almost a chronic character. Young horses are more liable to phrenitis than old ones.

What to do.—If discovered in the very earliest stage when the pulse is very full and quick, bleed the horse, taking from two to four quarts of blood. Give a purgative—recipe No. 48, and apply ice to the head and keep it on continuously. Give No. 30 as a sedative. If the fever entirely subsides and consciousness returns, blister all over the upper part of the head with No. 9. It is necessary to secure the animal well, for he struggles violently during the mad spells.

II. Cerebro-Spinal Meningitis.

This is not a common disease among horses in the cities, and is rarely or never seen in the country. It has existed as an epizootic in New York and Boston.

Causes.—Impurities in the air, the horse being kept in a small or overcrowded, ill ventilated stable, fed very high and not worked very hard. It is induced by a plethoric condition.

How to know it.—The horse seems listless for a day or two, stumbles, reels behind, and sometimes will fall quite down; the pupils become dilated; the pulse gets quick and full; respirations rapid; there is twitching of the muscles of the head and neck; at first he is sensitive to noises, but as the fever increases and the disease develops, blindness and deafness set in, and death soon follows.

What to do.—Put the horse in slings, if possible, before he gets so bad that he cannot stand, and apply ice and bran poultices to the whole length of the spine; give the purgative No. 48, and the following recipe in one-ounce doses three times a day:

No. 62.	8 Ounces bromide of potash,
	1 Pint water,
	Mix.

Effusion takes place on the brain and paralysis results. When the effusion reaches the centers that supply nerve power to the lungs and heart the animal dies.

III. Apoplexy.

Causes.—Apoplexy results from a sudden pressure on the brain when the horse is otherwise healthy; it is usually due to over exertion in a tight collar, causing a rushing of blood to the head.

How to know it.—There is insensibility, the horse staggers and falls; froths at the mouth; the muscles twitch; there is partial paralysis for the time being; respiration is suspended for a short time.

What to do.—Remove the harness as quickly as possible; give a free chance to breathe; and dash cold water over the head. He will soon recover and go on again all right.

Prevention.—Do not allow the horse to get too fat; see that the collar is not too short for him; it may press hard on each side of the neck to advantage, but it must have good length, at least two inches at the bottom below the neck; avoid fast driving when the horse is not in a condition to stand it.

IV. Megrims.

This is similar to apoplexy, but is a milder form of the disease.

Causes.—It is due to the same causes as apoplexy, but the animal recovers more quickly.



EXPRESSION CHARACTERISTIC OF MEGRIMS.

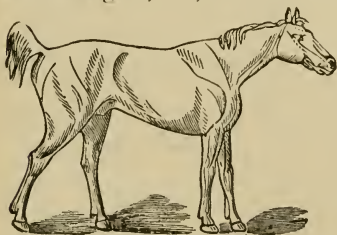
How to know it.—The horse stops, throws up his head, shivers all over, staggers; the eyes close for a minute; he braces his legs so as not to fall; stands so for a few minutes like a drunken man, shakes himself and goes on as if nothing had happened.

What to do.—See that the harness does not press too tight where it ought not to; if cold water is handy, throw a little over his head; if not, just let him stand and he will soon recover. It is a pet hobby with some to bleed the horse, to stick a knife through the partition in the nose, or into the second or third ridge in the roof of the mouth, but it is entirely useless and somewhat dangerous from overbleeding; it is often very difficult to stop the bleeding from these small stabs.

V. Tetanus or Lock-Jaw.

This is an excessively irritable condition of the whole nervous system, producing cramps or violent contractions of all the muscles of the body. It is an infectious disease, very painful, and fatal in from seventy-five to eighty-five per cent.

Causes.—It is due to a specific germ (the bacillus tetani) that gets into the system through a wound, usually on the outside of the body, such as nail pricks in the feet, punctures in the skin, following cartration, collar and saddle galls, etc., and sometimes it arises from the germs taken in with



TETANUS OR LOCKJAW.

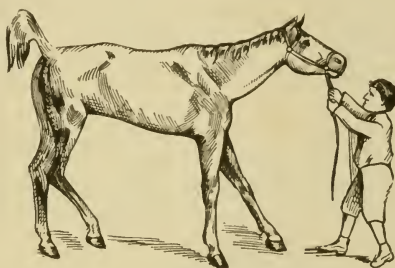
Note tenseness of muscles.

the food getting into a small wound in the stomach or bowels, made by some sharp indigestible substance. These germs exist in the soil nearly everywhere, especially in garden soil, and they grow best where there is the least oxygen, consequently, nail pricks in the feet are oftener followed by tetanus than other or larger wounds. The germs multiply and produce a chemical poison (ptomaine) that gets into the

blood, poisons it, irritates the nervous system, which produces the muscular contractions (cramps). Mild tetanic spasms may be caused by colds, over-

heating, sometimes following parturition, etc., but they are not specific and they usually recover. These are cases of *tetany*.

How to know it.—The first thing noticed will be the haw of the eye drawn over the eye ball, showing more of the haw and less of the eye; the nose is protruded; the neck straightened; the tail elevated and trembling; the legs straddle and are as stiff as saw-horse legs; the belly is tucked up; the nostrils dilated; the ears are as stiff as sticks; the respirations are hurried; the muscles are as hard as board; he sweats profusely; and the most serious point of all is the jaws are locked. If the disease is discovered at the start, the jaws will be found not to be locked, but very stiff and opened with difficulty; but they usually lock tight in the course of twelve hours.



SHOWING HOW FAR AN ANIMAL WITH TETANUS IS CAPABLE OF MOTION.

If the head is raised, the haw is drawn completely over the eye; the tail is more elevated; he trembles all over, and, if the head is pushed a little farther up, he is liable to fall. He never lies down; cannot eat; drinks with very great difficulty, and is in the most intense agony all the time. Death usually follows in from three days to three weeks, but if he lives nine days, he is likely to recover, and if he lives eighteen days, he is almost sure to.

What to do.—If it comes from a wound, and all the symptoms are fully developed, there is no use doing anything but to destroy the animal, and thus save a great amount of suffering; but if it is a mild case, give him a chance. Give the purgative No. 48. Put him in a quiet, dark, loose

box; allow no visitors; keep him as quiet as possible; put oatmeal water in his manger, and also a pail of clear water. Clothe him warmly, apply a linseed poultice to the wound, wherever it is, first smearing it with Solid Extract of Belladonna. Change the poultice once a day, and smear on the belladonna each time. Give internally the following:

No. 63.	2 Ounces fluid extract of belladonna,
	2 Ounces prussic acid, diluted,
	Water to make eight ounces.
	Mix.

Give a tablespoonful three times a day with a syringe.

Put him in a cool place, and get the purgative down, if possible. Let the same man tend him all the time, and allow no spectators, no loud talk, etc., let everything be as quiet as possible, and he will usually recover in the course of five or six weeks. Never bleed nor blister for lock-jaw, for the bleeding only weakens and the blistering only irritates the nerves all the more. Put him in slings early to keep him from going down, for if he lies down he oftentimes is unable to rise on account of the stiffness; this will certainly seal his fate unless raised very soon. Tetanus anti-toxin (a serum) is used considerably now (1899) with some success in developed cases, and is eminently successful in preventing it if given soon after the infliction of the wound. It is necessary to employ a veterinarian to give this treatment.

VI. Paralysis.

This is just the reverse of tetanus; the nervous system loses its power, and the part affected becomes helpless. It usually attacks the hind parts, but sometimes one side, and sometimes the neck and face.



A PROPER METHOD OF FEELING
THE PULSE.



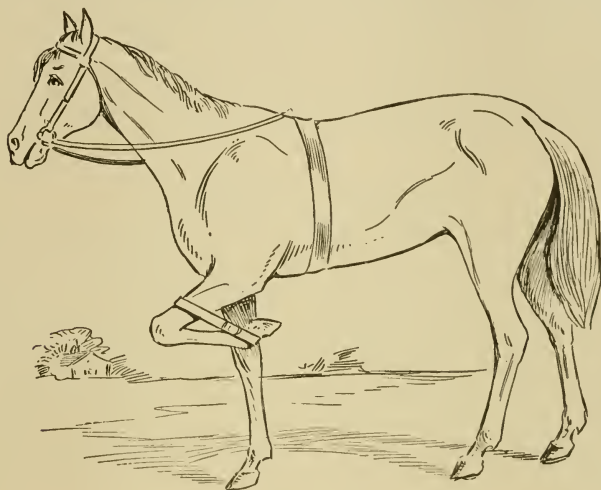
EFFECTS OF SUNSTROKE.

Causes.—Injuries to the back are common causes, in which case there is paralysis of all parts back of the injury. It usually accompanies *azoturia*, cerebro-spinal meningitis, lead poisoning, sun-stroke, etc. When half

the body, face, or neck is paralyzed, the cause lies in the constitution, and is not apparent; or it may come from abscess in the brain.

How to know it.—The horse lies in a helpless condition; he can raise himself forward, but is utterly powerless behind. Prick him with a pin, anywhere back of the injury, and no sensation is produced. If it is paralysis of one side, that side is partially helpless; he drags the legs. If it is in the neck and face, the part will be twisted towards the well side, and the diseased part without sensation.

What to do.—If the horse can stand at all, put him in slings; if not, let him lie down as comfortably as possible. Turn him twice a day, to prevent scalding. Clip off the hair close, and blister well with recipe No. 9,



HELPING HIM TO STAND FOR TREATMENT.

Also first step in throwing—See page 550.

along the spine from the seat of the injury back to the croup. If it is paralysis of the face and neck, apply the blister to the base of the brain, over the poll. Rub the surface well with liniment No. 14. Give internally the following powders:

No. 64.

1 Drachm powdered nux vomica,
2 Drachms powdered gentian root,
 $\frac{1}{2}$ Ounce linseed meal.
Mix.

Give as one dose; repeat it once a day for two or three weeks; then let him wait a fortnight, and repeat it. When convalescent, give gentle exercise. Abscess in the brain is almost always fatal.

VII. Sun-Stroke.

This is common in some parts of the country, especially in large cities. It is a loss of water in the blood, owing to overheating of it, especially in humid atmosphere. It is usually fatal unless promptly and vigorously treated. All the functions of the body are interfered with or almost stopped.

Causes.—Exposure to the hot sun, or over-exertion in hot weather, even if the sun is not shining. Some animals are more subject to it than others, probably depending upon the condition of the system at the time.

How to know it.—The horse may be sweating and suffering with the heat, when suddenly he will stop sweating and dry off; will begin to stagger; get dumpish, deaf, weak and stupid; there will be labored breathing and he will soon drop in the road in an unconscious condition; the breathing will become more and more labored till death takes place, which will be in from half an hour to two or three hours if no relief is given. The surface of the body will be found to be very hot to the touch of the hand.

What to do.—When the horse begins to suffer and labor with the heat, let him stop in the shade; give a few swallows of cold water to drink, and also sponge off the head and face with cold water. After half an hour he will be able to go on. If he has been compelled to go till he drops, or even till he is in a staggering condition, throw cold water all over him; or if it is in a city where a hose can be used, keep it playing on him from head to tail continuously till he is cooled off; then leave him in a cool place, but not in a draft; let him rest till next day. If it is in the country throw cold water over him by the bucketful till he recovers. If he goes down, use ice on the back if possible. As soon as he is sufficiently recovered to be able to swallow safely, give the following drench:

No. 65.

2 Ounces whiskey.

$\frac{1}{2}$ Ounce sweet spirits of nitre,

1 Drachm nitrate of potash.

$\frac{1}{2}$ Teacupful water,

Mix.

Give as one dose, and repeat it every half hour till he is pretty well recovered; then drop off to every four or six hours. Leave him in the stable at least a week, and be very careful of him for a long time. During recovery feed on soft food—grass if it can be got. If it leaves him weak and staggering in his gait, clip off the hair from the back and blister with recipe No. 9.

CHAPTER XII.

DISEASES OF THE HEART AND BLOOD VESSELS.

- I. INFLAMMATION OF THE ENDOCARDIUM.—II. ENLARGEMENT OF THE HEART.—
III. ATROPHY OF THE HEART.—IV. INDURATION OF THE HEART.—V. FATTY
DEGENERATION OF THE HEART.—VI. OBESITY OF THE HEART.—VII. CYANO-
SIS OR BLUE DISEASE.—VIII. RUPTURE OF THE HEART.—IX. RUPTURE OF
A BLOOD VESSEL.—X. ANEURISM.—XI. PHLEBITIS OR INFLAMMATION OF A
VEIN.—XII. THUMPS.

Diseases of the heart are numerous but difficult to diagnose, except by their effects. Few of them are influenced by treatment; therefore this short chapter on the subject, is given more as a matter of general information than of practical utility.

I. Inflammation of the Endocardium.

This is inflammation of the sac surrounding the heart. This sac is a serous one, similar to the *pleura*, and secretes a fluid to moisten and lubricate the heart in its perpetual motion.

How to know it.—The horse will attract notice as not being in his usual healthy form; his head will hang down; the countenance will express pain; he will stand still with no inclination to move; the pulse will be raised considerably. Upon application of the ear to his side over the region of the heart, a harsh rasping sound will be heard indicating the dry stage of inflammation.

What to do.—All that can be done to advantage is to treat the horse constitutionally by giving recipe No. 40. Feed on soft food for a few days; keep him warm and apply No. 41 to the side over the heart.

II. Enlargement of the Heart.

This is not uncommon; the heart sometimes increases to twice its natural size. This is especially so of the left ventricle; its walls sometimes get unusually thick.

How to know it.—It cannot be definitely recognized during life, but a fair opinion can be based upon the pulse, which will be irregular in its action, both as to force and number of beats. The temperature of the body will be uneven; one side may be cold, and the other warm, one leg cold and the others warm, etc.

What to do.—Give the following recipe :

No. 66.	1 Drachm iodide of potash,
	1 Drachm powdered nux vomica,
	1 Drachm powdered fœnugreek seed,
	Mix.

Give as one dose in a bran mash, and repeat it morning and night, for three or four weeks. Feed on soft food, and give gentle exercise.

III. Atrophy of the Heart.

This is a shrinking and wasting away of the substance of the heart. The walls become soft and flabby, and fail to perform the work in a healthy manner.

How to know it.—The pulse will be weak and irregular—often missing two or three beats at a time. There will be emaciation, languor, pallor of the visible mucous membranes. Death is liable to occur suddenly, at any time, from complete interruption of the circulation by *ante-mortem* clots, that is, clots that form in the heart and blood vessels before death.

What to do.—Give the following powder night and morning, in soft feed.

No. 67.	1 Drachm nux vomica,
	1 Drachm sulphate of iron,
	1 Drachm fœnugreek seed,
	Mix.

Give this at one dose, and repeat it morning and night for three or four weeks. Give gentle exercise, and feed some oil-cake meal every day if he will eat it. Feed well.

IV. Induration of the Heart.

This is a hardening of the substance of the heart, which sometimes becomes almost as hard as wood. There are no characteristic symptoms other than the weak, irregular pulse, and sudden death at some unexpected time. Nothing can be done.

V. Fatty Degeneration of the Heart.

The fleshy substance of the heart degenerates into a kind of fatty substance that is not strong, and may be easily pulled to pieces by the hand after death. There are no symptoms to recognize it by except the weak, irregular pulse. Death is apt to occur suddenly, from *ante-mortem* clot.

VI. Obesity of the Heart.

This is an accumulation of fat around the heart, which interferes with its action, giving rise to a quick, fluttering pulse as though the heart were laboring under a load that muffled it. It makes the breathing short, and

the animal will pant after the least exercise. Nothing can be done. Death is liable to occur from suffocation when the horse is put at hard work.

VII. Cyanosis, or Blue Disease.

This is very uncommon in the horse. The circulation peculiar to foetal life does not change at birth, as it ought to, by the closing of a temporary opening between the right and left sides of the heart. The failure of this opening to close at birth allows the venous blood to pass right through into the arteries without going through the lungs to be aerated, and gives a blue color to all parts that ought to be pink—the eye-lids, mouth, etc. The animal does not live long, but dies in the course of a week or two. The surface of the body never gets warm; the respirations are usually slow, and there is great weakness, which increases as death approaches.

VIII. Rupture of the Heart.

Horses are liable to rupture the heart at the time of any sudden exertion or jerk. Those with heaves are the most often affected. The right ventricle and the auricles are most liable to it; the left ventricle has walls so thick that rupture of them rarely takes place. Nothing can be done for it. Instant death is the result.

IX. Rupture of a Blood Vessel.

This is a more common accident than any other pertaining to the heart and blood vessels. Any very severe exertion, such as racing, trotting, jumping, extra hard pulling etc., is often interrupted and brought to a stand-still by the rupture of a blood vessel. Those most liable to rupture are the arteries and veins in the abdominal region of the body; the next those in the chest, head, etc. There is no way of foreseeing its approach nor of obviating its effects, which are always fatal from internal hemorrhage. Having the horse in as fine condition physically as possible for any extra exertion is the only way of diminishing the liability to its occurrence.

X. Aneurism.

Arteries are liable to get weak in their walls (a tendency to rupture), and dilatation is the result, owing to the immense pressure of the blood from the action of the heart. The large arteries in the abdominal cavity near the back are most often affected in this way.

How to know it.—If it is suspected, examine the parts internally by the hand inserted in the rectum; a large bulge or elliptical enlargement and distinct pulsations are felt when aneurism exists. The swelling is soft and compressible.

What to do.—Nothing can be done for it in that position ; if it occurs on the outside of the body, apply cold water and ice, and a compress to the enlargement.

XI. Phlebitis, or Inflammation of a Vein.

This is far less common now than it was a few years ago, owing to the practice of bleeding being done away with ; for it was a common result of bleeding, either from using a rusty fleam, or from the horse catching cold in the wound afterwards, or from improper care, the horse not being kept clean. It may result from any wound.

How to know it.—The vein swells and gets hot, sore, red and painful ; the inflammation spreads to surrounding parts, and considerable tumefaction is the result. The effect of this condition of things is quite often obliteration of the vein ; it becomes hard, filled up, and ceases to act as a vein. The result is not so serious as might be supposed, except when the jugular vein is the one affected ; then the horse cannot graze, owing to the blood that is forced to remain in the vessels of the head and neck, causing congestion of those parts, they being in a pendent position.

What to do.—Foment the part affected with hot water three times a day, and manipulate the vein and get the obstruction to move on if possible

XII. Thumps.

This is an excited, spasmodic action of the heart, due to over-exertion—it may be from pulling in heavy draft, leaping or driving. It is most likely to occur in very hot weather.

How to know it.—The horse appears to be in distress, and is pressed for breath ; the heart thumps away as if it wanted to make a hole and get out ; it often shakes the whole body ; the countenance has an anxious expression, and the horse usually sweats profusely.

What to do.—Give something to revive the nervous system, and stimulate the heart to a healthier action. Give recipe No. 65. Rub him down well, put on a blanket if the weather is cold, and give a bran mash to eat. Let him rest for a day or two, and the nervous system will regain its strength, and the horse be as useful as before.

CHAPTER XIII.

GENERAL DISEASES OF THE BLOOD.

I. INFLUENZA—EPIZOOTY—"PINK EYE."—II. PURPURA HEMORRHAGICA.—III. RHEUMATISM.—IV. ABSCESES.—V. ERYSIPELAS.

I. Influenza—Epizooty—"Pink Eye."

Influenza is the name given to a blood disease in horses that is peculiar in many ways. It is known as the *Epizooty* and "Pink Eye." It is a blood disease, in that it is caused by the introduction into the system of a poison that has its origin in the atmosphere, and cannot be isolated; it is supposed to be of a malarious nature due to influences very extended in character.

The great epizooty of 1872 extended over the most of Europe and the whole of North America. It spread from East to West, moving slowly, attacking all animals of the equine race, and lasting from one to three weeks in each locality. It proved fatal to a great many horses; it laid all horses up for a few days at least, so that in all large cities the streets were clear of horses for about a week. It left a great many horses with chronic cough and debilitated systems from which they never recovered, so that they were left in a condition that invited diseases of all kinds, many of which proved fatal, coming as they did in fall and winter.

The "Pink Eye" of the year 1881, was less general in its attack, and milder in its character in some respects, but more severe in others. It was more severe in the latitudes including the cities of New York, St. Louis, Detroit, Chicago, etc. It was very mild both north and south of the above mentioned latitudes. It was fatal in many cases, but mostly either from want of care or improper treatment.

It was called "Pink Eye" from the redness of the eyes, which was a prominent symptom in all cases. It was of a complicated nature, there being catarrh of the mucous membranes, both of the respiratory and alimentary tracts; typhoid fever; acute rheumatism; and, in some cases, inflammation of the lungs, bowels and brain; and occasionally tetanus.

How to know it.—The first symptom noticed will be languor; dullness in harness; weakness; sweating easily; and, in very many cases, actual staggering from weakness and nervous prostration in the course of ten hours after being first taken. The horse hangs his head; the ears

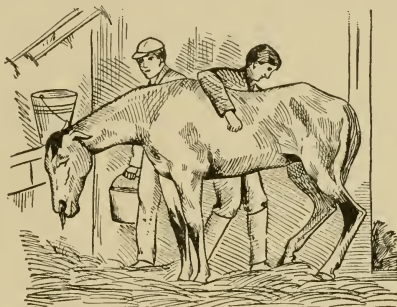
droop; the appetite fails; the eyes become very red; the pulse very quick, frequently as high as seventy to eighty per minute, full at first but gradually getting weak; the respirations are rapid; the eyelids swell sometimes so as to close entirely; the temperature taken by the thermometer will show as high as 105° to 107° F. All these symptoms will appear in the course of twelve hours. In the next twelve hours there will be colicky pains, and constipation; the stools will be rather hard and dry and covered with slime, indicating a feverish lining to the bowels; the legs swell tremendously and get very sore to the touch, especially around the fetlock joints and along the back tendons; the mouth is very hot, and sometimes dry; the eyes run tears profusely, which flow down over the face; the surface of the body in most cases is very hot to the touch; the urine is scanty and high-colored; the thirst great; in some cases there is swelling of the throat and a cough; the nose runs a watery discharge. During the second and third days the eyes discharge matter which runs down the cheek, scalding off the hair; the discharge from the nose becomes purulent and sticks around the nostrils; the legs get sorer; the bowels loose; sometimes diarrhœa sets in and carries the animal off suddenly; sometimes constipation appears which usually runs into inflammation of the bowels and kills; the lungs are liable to take on an inflammatory condition and run into pneumonia, often causing death; and the fever often goes to the brain and causes phrenitis which is usually fatal. Horses with influenza lie down a great deal at first, but if the lungs become affected, they persistently stand, and they lose flesh most unaccountably fast—it goes off as though it were whittled off, leaving a fat hearty animal as thin as a skeleton in a week.

They may refuse to eat; and the fever may continue to increase, and weakness become so great as to prove fatal without any other complication.

The favorable symptoms are return of the appetite; diminishing of the swellings around the eyes and legs; ability to lie down comfortably; bowels and kidneys regular; and a brightening of the countenance.

What to do.—When the first symptoms are noticed, lay the horse up at once; see that the stable is clean, dry and well-aired, but no drafts; put on blankets, and bandages to the legs; give soft feed to eat, if they will take it, and anything they may fancy, if the appetite is poor; a little corn, oats, carrots, apples, etc.; but the best food is oats and bran in equal parts, wet up and steamed with boiling water; all the treatment must be given with a view to sustaining the strength. For medicine, at the outset, give No. 40, in two-ounce doses, every two hours, till the fever is checked; continue it night and day till the thermometer comes down to 103° ; then hold up on it a little, and give it only three times a

day, and when the temperature comes down to 100, change to No. 18—three times a day—for a couple of days; then, if everything is progressing favorably, give No. 35 three times a day, or No. 34 in the feed twice a day. If the throat swells, and there is a cough, rub the throat with No. 41. If the fever goes on to the lungs and causes bronchitis or pneumonia, apply No. 41 to the sides and chest, and give the other recipes as directed above. Set a pail of water in the manger, so he can



A HORSE WITH INFLUENZA.

drink a swallow or two often to cool his mouth and throat. Give plenty of bedding, and make him as comfortable as possible. The bowel trouble you need not give anything for, unless the colicky pains hang on for several hours, then give No. 52. If the diarrhoea is distressing, give him flour, one pound in a pail of water to drink instead of clear water. There is no danger of constipation in this disease. If there is long-continued weakness, give No. 64 alternately with No. 35. During convalescence, give gentle exercise. For treatment of lung complications, see pneumonia.

II. Purpura Hemorrhagica.

This is an infectious, hemorrhagic disease, in which the red corpuscles are destroyed, the blood becomes thin, the tissues of the blood vessels get weak and relaxed, allowing the blood to ooze through them into surrounding cellular tissue and into cavities, and is inclined to settle to dependent parts, into the legs, under the belly and chest, and around the muzzle.

Causes.—It is due to a specific bacillus, a micro-organism that exists in filthy stables, especially badly drained and ventilated ones. The disease attacks horses most often that have become debilitated by some other disease, such as influenza, but it often attacks the strong, vigorous, well-fed ones, and runs in them a malignant course, causing death in three or four days, but when occurring secondarily to influenza, or other debilitating disease, it is frequently of a milder type, and the animals recover in from two to six weeks.

How to know it.—The limbs swell enormously, so much so that the animal can scarcely move. The swelling begins in the lower part of the legs, and keeps coming higher from hour to hour, there being an abrupt termination of the swelling at the top. It continues to rise till it reaches the body; then extends along the belly, the full width of it, and as thick as a small mattress.

Yellowish, watery fluid will ooze through the skin and trickle down the legs. The same from the belly, but to less extent. The muzzle begins to



PURPURA.

Appearance of horse's head with purpura.

swell the same as the legs, and the swelling extends up towards the eyes, often completely closing them. The breathing becomes labored. The secretions are usually at a stand-still, especially the urine, none being secreted; the water, when it accumulates around the internal organs, causes death. The visible mucous membranes will be found to be covered with purple patches, varying in size from a dime to a fifty-cent piece. The pulse is small, weak and wiry. The discharges on the legs and belly have an offensive odor, and the breath is also offensive.

Great debility is a prominent symptom; the horse is unable to eat or drink. The disease is generally fatal, either by the causes mentioned above, or by suffocation from the swelling of the nose, or by gangrene of the internal organs. Usually, before dying, the animal presents a most horrible sight, so as to look like almost anything else than a horse.

What to do.—Begin early to give the following recipe:

No. 68.

1 Ounce tincture muriate of iron,
2 Ounces sweet spirits of nitre,
2 Drachms quinine.
Water to make one pint.
Mix.

Give two ounces every two hours with a syringe, so as to get it back into the throat with as little trouble and worry to the patient as possible. Alternate with No. 68, the following:

No. 69.

1 Ounce turpentine,
3 Ounces linseed oil,
Mix.

Give a tablespoonful every two hours. Alternating these two recipes will fetch doses only one hour apart; continue these as persistently as possible, till he is either better or dead. Give oatmeal gruel to drink, and give anything to eat he can masticate. If he cannot eat nor drink, give oatmeal gruel injections. Foment the head, if swollen, with hot water as persistently as possible, with the view of driving the swelling to other parts. Let the other swellings entirely alone.

The favorable symptoms will be a diminution of the swellings, return of the secretions and appetite, improvement of the pulse, and disappearance of the purple (echymosed) spots.

III. Rheumatism.

Causes.—This is supposed to be an accumulation, in the blood, of a peculiar acid that settles around joints, along tendons and sometimes in muscles. Upon the slightest provocation in the way of exposure or derangements of the stomach or bowels, it is apt to assume the acute form, and to cause intense pain and lameness.

How to know it.—There is lameness, usually of a peculiar kind, flying from one joint to another, and from one leg to another; sometimes the parts swell and sometimes not; the joints most commonly affected are the fetlocks, knees, shoulders and hips. There is usually more or less fever, high pulse, and sometimes suppuration of the affected parts.

What to do.—Give recipe No. 36. Foment the affected parts with hot water three times a day and apply, as a liniment, recipe No. 15, after wiping down the legs quite dry, and bandage warmly with flannel. After the most acute symptoms are gone, give walking exercise.

IV. Abscesses.

An abscess is a gathering of pus in a sac from a morbid process in the tissues. It may develop in any part of the body. The most common locations of them are on the ribs, on the belly, in the groin, in the *levator humeri* muscles, etc. They sometimes attain to tremendous proportions; they are not painful as a rule, but if they come in or near a nerve center there is great pain; when they form in the groin, for instance, there is great pain; while on the ribs they cause little or no pain.

Causes.—Impurities in the blood from retention in the system of effete matter that should be eliminated through the excretory organs—the bowels, kidneys and skin. The exciting causes are sometimes bruises from blows, kicks or other injury; but these bruises are not sufficient in themselves to cause an abscess, but must be accompanied by the morbid condition of the blood; then the injury may simply afford an excuse for its breaking out in that particular place. The pus germ is usually found in them, and is thought, by bacteriologists, to be the same as suppuration.

How to know it.—There is always a great amount of swelling, hard at first all over; but as it grows and approaches a full development it gets soft in the center, pitty in a ring around the center, and hard on the outside. It is hot, red, and sore to the touch. It takes from one to six weeks to mature an abscess so it will break of itself, according to its location and depth. Those in the groin take three or four weeks to mature;

those on the ribs and belly mature in the shortest time above mentioned; and those in the *levator humeri* muscles (found just inside and in front of the joints of the shoulders) take the longest time to mature. In fact, the latter sometimes acts like a tumor by its slow growth, hardness and length of time it takes to break out without outside assistance.

When opened, the pus runs out, and the abscess usually heals readily; but sometimes the healing process requires a great deal of assistance, and the abscess is liable to start anew and develop others as soon as one is healed, unless the cause is removed by purifying the blood.

What to do.—Give a purgative of recipe No. 25, and when it has stopped purging, give No. 34 for a week or so. Poultice the abscess with any hot, soft poultice—linseed meal is the best—till it points, (comes to a head), in a soft spot; then tap it with a pointed knife, and evacuate the sac; make the opening big enough to allow a finger to be passed in; see that all is clear for a thorough emptying; then inject warm water to wash it out, and inject No. 5. Repeat this twice a day. Make the opening at the bottom, if possible, to allow the pus to gravitate out, instead of having to be squeezed out. The abscess in the *levator humeri* muscle is always deep-seated in the muscle, and requires a great length of time to rot out. It is easily recognized by its position, being inside and a little to the front of the point of the shoulder. It is useless to wait for it to come to a head; open it at once. Take a long-bladed scalpel or pocket knife and run it in directly into the center of the tumor, letting the knife be parallel with the horse's body; then there is no danger of tapping the jugular vein. It is necessary, usually, to cut about four inches deep before reaching the pus, but when once emptied it heals very readily.

V. Erysipelas.

This is inflammation of the skin. It may be superficial and only involve the upper layers of the skin, or it may be deeper-seated and involve the under layers. The superficial does not suppurate, but the deep-seated usually does, with more or less sloughing. It is often thought to be contagious, which it undoubtedly is to a small degree; but not sufficiently so to be ranked as a specific blood poison. It sometimes rages as an enzoötic—common in any certain district. It usually follows wounds, injuries and sores, but sometimes comes on apparently healthy skin.

Causes.—It is due sometimes to the weather, when it is damp, hot and oppressive, with thunder frequent and low barometric pressure, especially if the horse is kept in low, filthy places. Poorly fed, thin, neglected animals are most subject to it. The sudden suppression of a chronic discharge, and feeding on rich, heating food when the animal has been

accustomed to poor, scanty food, and keeping animals with open sores near decomposing animal tissue are also cause of erysipelas. The common means of contagion are washing erysipelatous and healthy wounds with the same sponge, using the same harness, clothing, etc.

How to know it.—There is usually some fever; the pulse and temperature are raised; the urine is scanty and high-colored; the bowels usually constipated; there is loss of spirit and appetite. These symptoms are followed, in the course of twelve hours, by a diffuse swelling that is hot, red, and painful; if it is on a white skin it will be found to be shining, tense and of a deep red. It spreads rapidly, terminating abruptly at the edges in a well defined line of demarkation. The swelling does not pit on pressure; the redness disappears on pressure, but returns when the finger is removed. It is confined to the head and legs. It has a peculiar smell, like that of burnt hair.

Sometimes it extends to the cellular tissue under the skin when it is known as *phlegmonous*; this always suppurates, and has a purple appearance previous to breaking.

What to do.—Give tonics and stimulants internally; give recipes No. 37 and No. 35; if much depression exists, give No. 65. Feed on boiled oats, barley, etc. Apply locally No. 24, and keep the part wet with it continually. If the swelling spreads in spite of this lotion, paint the healthy skin for two inches all around the diseased part with tincture of iodine, and change the lotion to the following:

No. 70.	1 Ounce tincture muriate of iron,
	8 Ounces water,
	Mix.

Keep the surface wet with it till the skin begins to be irritated; then go back to No. 24. If extensive sloughing takes place, poultice with oil-cake meal, with charcoal sprinkled over the poultice, till a healthy sore is obtained; then apply lotion No. 7. If the erysipelas comes from an unhealthy sore, cauterize it with powdered bluestone continuously, once a day, till all signs of a purplish, unhealthy condition, have disappeared; then continue the lotion No. 7. Continue the tonics for several weeks, giving soft food enough to keep the bowels loose.

CHAPTER XIV.

CONTAGIOUS BLOOD DISEASES.

I. GLANDERS AND FARCY.—II. STRANGLES.—III. RABIES OR HYDROPHOBIA.—IV. HORSE POX OR EQUINE VARIOLA.—V. SURRA.—VI. MYCOTIC LYMPHANGITIS, OR JAPANESE FARCY.

Diseases are said to be contagious when they reproduce themselves in a healthy animal, either by inoculation and absorption of the virus into the system through a wound or mucous membrane, or by absorption of disease germs floating in the air or in the water that the animal drinks.

I. Glanders and Farcy.

These are different forms of the same disease, which is a specific poison that affects the whole system. When it breaks out in the nose, affecting also the lungs and lymphatic glands between the branches of the lower jaw, it constitutes glanders; when it attacks the lymphatic glands and other tissues of the legs and body, it constitutes farcy. The two forms of disease often exist separately, but usually symptoms of both will be found in the same case. The contagion lies in the discharges from the ulcers, either those in the nose or farcy buds; it is contagious only by inoculation, the poison being of heavy specific gravity and not volatile. The virus from glanders may produce glanders or farcy, or both; the virus from farcy may do the same. The mode of inoculation is usually through the nose or mouth, by the introduction of the virus taken by one horse working in double harness with a glandered horse, or standing in the same stall, rubbing his nose on a hitching post or fence or edge of a water trough where a glandered horse has stood. These latter are common channels through which glanders is got; for when a glandered horse is driven up to a post or water trough, the first thing he does is to rub the accumulations of matter off his nose, the clogging of which is uncomfortable. And so great is the vitality of the virus, that a horse coming along an hour, a day, a week, or even a year after, and happening to rub his nose on the same place gets the disease by inoculation.

The poison may lie latent in the system a week, or a month, or two months and then break out, perhaps violently, and run the acute course, causing death in three to six weeks; or the disease may appear in a very mild form and run the chronic course, so that the horse may live in very

comfortable condition for one to three or four years, though sowing the seeds of contagion for other horses to gather all the time, thus doing an inestimable amount of harm.

When the disease breaks out, it does so by ulceration of the tissues involved. These ulcers differ from ordinary ones, by their resistance to treatment; if made to heal, they break out again either in the same or another place, and have a tendency to spread and slough, eating away the tissues till the ulcers become confluent and the *Schneiderian* membrane (lining of the nose) is destroyed. The disease was known in the earliest times, and was written on by Vegetius, Rouan, and many others; but it was not well understood as to its actual seat till La Fosse discovered that it lay in inflammation and ulceration of the nasal membrane. The poison of glanders and farcy is communicable to men, goats, sheep and dogs, with all the characteristic symptoms of the disease in horses, and is contagious from man back to the horse or ass.

Causes.—It is due to the germ called *bacillus mallei*, discovered by Löffler and Schütz in 1882, which exists in all of the purulent discharges. It is usually propagated, fostered and extended by contagion through the villainous traffic carried on in glandered horses by unscrupulous dealers. For many diseased animals retain the appearance of health sufficiently well



BAD CASE OF GLANDERS.

to be bought and sold many times, the dealers explaining the discharge from the nose as coming from a cold, and the swollen legs as resulting from impurities in the blood; and Tom, Dick and Harry, thinking they "know all about a horse," buy the animals, believing the explanation of the dealer to be true; and thus thousands of dollars worth of stock is ruined each year by the spread of this fatal disease.

But the disease sometimes arises spontaneously in armies, on ship-board, or in overcrowded, low, damp, badly-ventilated stables. Overcrowding is the

chief cause of its spontaneous appearance, the horses, asses or mules being compelled to breathe over and over again, air vitiated by the emanations from their own faecal matter and from their bodies, and which has been exhausted of its oxygen by passing through the lungs a number of times.

How to know it.—Acute glanders is characterized by languor; dry, staring coat; red, weeping eyes; loss of appetite; quick pulse; elevated temperature, the thermometer registering 103° to 106° F.; accelerated breathing; a grayish purple color of the lining of the nose; a watery discharge, which soon becomes yellowish and sticky, causing the hair on which the matter accumulates in and around the nostrils to stick together. The discharge looks like melted butter, and when dropped into water it sinks. The glands under the jaw swell and often adhere to the bone, but not always. The partition between the nostrils will become ulcerated;



GLANDERS,
When the discharge has become purulent.

small yellow points with purple bases will come up and burst, making the discharge bloody for the time. These ulcers, with elevated edges and depressed centers and purple bases, will spread and become confluent, eating away the membrane till little or nothing of it is left; the discharge increases and has a horribly offensive odor; the lungs become affected by ulcers forming in them; the breathing becomes labored, and the animal finally dies, the most emaciated and disgusting object imaginable.



GLANDERS,
In the last stage when the pus is mixed with blood from extensive sloughing.

The chronic course is longer continued and runs less rapidly; but all the same symptoms are developed, with the exception that the appetite is less impaired till near the last; the discharge is less copious and offensive, and emaciation does not take place so rapidly. But if the horse is exposed to any degree of hardship and cold storms, the chronic form may run into the acute form at any time. The



SECTION OF A LUNG

Of a glandered horse, showing the existence of tubercles.

cough is not always noticed, and the ulcers are sometimes so far up in the nose as to be out of sight. It is often necessary to inoculate a worthless animal in order to determine the disease. If it is glanders, it will probably prove fatal to the one inoculated in two or three weeks, running the acute course.

Farcy is recognized by swelling of the legs affected, usually one or two, though sometimes all four. The swellings are along the lines of the lymphatic veins on the legs, belly or any part of the body; small nodular points come up, which break and discharge a glairy unhealthy pus, run a few days, dry up and leave a scar or bare spot that usually lasts to tell the tale as long as the horse lives; other nodules follow and spread nearly all over the body, head and neck; the swelling of the limbs does not

yield to treatment, and they soon become chronically enlarged. The discharge is contagious the same as that of glanders. Farcy sooner or later runs into glanders and terminates fatally. Doubtful cases can be proven by testing them with mallein, a toxin prepared from the cultivated bacillus. The services of a qualified veterinarian are needed to make this test.

What to do.—Treatment should not be attempted at all, for it is always fatal in spite of the most scientific and persistent efforts; the fatal termination may be postponed for a while, but the animal is sowing the contagion all the time, and doing an inestimable amount of damage. The fact that the disease is contagious to men, and always fatal too, is another reason why no man should attempt to treat a case a moment after it is satisfactorily diagnosed. When any doubt exists, or a suspicious case is seen, isolate the animal at once and quarantine him; prevent any communication with other animals, and await developments. The discharge of catarrh being whitish and more mucous in character, is easily recognized, and the nasal membrane never assumes that mouse-eaten appearance that is seen in glanders. Shoot every animal known to be affected with glanders, and bury the carcass very deep.

Prevention.—Avoid overcrowding and poor ventilation. See to it that no affected animals are allowed to run at large, or even to be used about the place in any way; avoid letting horses drink any more than is absolutely necessary in public troughs. Either tear down and burn any infected stable, or have it disinfected under the supervision of a qualified veterinary surgeon. All suspected cases should be placed under his charge till the doubt is settled.

It should be made a criminal act, with a heavy penalty, to expose affected animals in public places, or to sell or offer them for sale. A health commission of three qualified veterinary surgeons should be empowered to destroy glandered horses, with or without the consent of the owner; and the State should bear half the loss, by reimbursing the owner with half the value of the animal before he took the disease. It is a misfortune for which he is not to blame, and which the State should help him to bear.

II. Strangles.

Strangles is a specific blood poison, peculiar to horses, and usually confined to young ones. It depends upon a morbid condition of the system, is contagious, and corresponds to children's diseases in human medicine. It is most common in damp, cold seasons. The poison in the blood manifests itself in large, phlegmonous abscesses around the throat; this is the usual manner in which it breaks out. But in some cases it takes a very different course, breaking out in abscesses on any part of the body. Sometimes no abscesses gather at all, and the fever remains diffused in the system, instead of coming to a head in one place. These

last two kinds are called bastard or unusual strangles. - It is often fatal, but such cases are due to neglect, to colds from exposure while the fever is high, etc.

Causes.—It often arises spontaneously, from the existence in the system of some morbid matter developed while growing; for spontaneous cases are only found among young horses; when older ones have it, it comes from contagion.

How to know it.—There are all the indications of fever—quick, weak pulse; high temperature; hot mouth; cold extremities; staring coat;



A BAD CASE OF
STRANGLES.

loss of appetite, and nervous prostration. In a few hours the throat begins to swell, both on the sides and between the branches of the lower jaw; this swelling is sometimes immense, and makes the colt hold his neck and head stretched out in one position, stiff, like a child with the mumps. There is usually a distressing cough and inability to swallow; often there is a desire to eat, but the throat is so sore he cannot swallow. The nose runs a mucous discharge at first, which soon becomes purulent; the eyes very red, and tears run down over the cheeks. The swelling is painful and sore upon pressure, and usually breaks in about a week, and discharges pus. When these swellings come in the lungs, the breathing will

be affected, and the chest will be sore upon pressure or percussion on the ribs, and he will stand all the time. If it comes in the abdomen, colicky pains are felt, and he lies down nearly all the time. Sometimes it comes around the heart. Any of these unusual forms are likely to be fatal.

What to do.—Avoid depletives of all kinds, and foster the strength of the patient in every possible way. If the bowels are constipated, give a few injections, but do not risk a purgative; give recipe No. 40 every two to six hours with a syringe, for it is unsafe as well as painful, to try to drench him with the throat in that condition. Apply hot linseed poultices to the swellings, and let them get very thin indeed before opening them; or, even let them burst of themselves to avoid that thickening often seen after being opened. It is no use trying to check it; it must run its course. Give him a warm, dry place, well ventilated, and nourishing food such as boiled oats, barley, roots, etc. During convalescence give recipe No. 35.

III. Rabies or Hydrophobia.

This is a specific blood poison, arising spontaneously in the *genus canis* (dog, fox and wolf) and in cats. It is communicable to all animals and to man, but can only be inoculated by a bite. The virus lies in

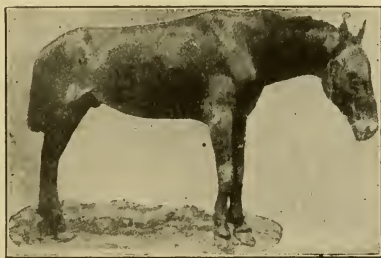
the saliva and blood, but not in the milk. Nearly all animals bitten by a rabid dog, are attacked with the disease in the course of time, but man seems to possess a partial immunity; only a small percentage of the men bitten by rabid animals have rabies.

Incubation.—The period of incubation varies in different animals. The horse goes fifteen to ninety days, usually thirty; cattle, twenty to thirty days; sheep, twenty to seventy-four days; swine, twenty to forty-nine days. In man the period of incubation varies from a few days to a few months, though some cases develop after a year or so, or even longer, the rabies at last being more the effect of fear and long continued anxiety and worry over the possible effects of a bite, than of the bite itself.



COUNTENANCE OF A HORSE WITH
RABIES.

How to know it.—The horse becomes frantic with fever and pain; delirium sets in early; he neighs, paws, bites his manger, clothing, etc.; is ravenous for water but swallows with difficulty; he grows worse till death takes place by paralysis.



IRREGULAR STRANGLES.

What to do.—No treatment is of any avail; if there were anything that could be given, it would be too risky to attempt it; but so far, science has discovered nothing to prevent a fatal termination. As soon as a case is suspected isolate the horse, tie him so that he shall be powerless for harm, and await developments. As soon as it is satisfactorily recognized destroy him.

IV. Horse Pox or Equine Variola.

Nearly all animals have a pox peculiar to their kind, although all forms of pox seem to be closely allied. They are all contagious from one animal to another of the same species, and usually among the different species to a greater or less extent. Having any of the different kinds of variola once, gives immunity from subsequent attacks of the other kinds, for a number of years at least. Kine pox, taken either by inoculation from the cow or by vaccination, confers immunity, to a great extent, from small pox. Horse pox appears to be identical with kine pox; the one can not be distinguished from the other when inoculated into man, ox or horse.

Horse pox usually attacks the limbs, but sometimes the face, mouth, lips, flanks and other parts of the body.

How to know it.—There is slight fever, which is often unnoticed; heat and swelling of the affected part for a day or two; then hard nodules form, increasing in size to about half an inch in diameter; the hair ruffles up and the skin reddens around the pock; on the ninth to the twelfth day, a limpid, yellowish fluid flows from the pustules, and sticks the hair up in yellowish scabs or streaks, on the removal of which a red, raw depression is seen with the scab fixed in its center. In three or four days the secretion ceases, the pustules dry up, and the part heals and the scabs come off.

The most active virus is the lymph that runs from the pustules. It is readily carried from horse to horse by the grooms on their hands or clothes. It sometimes exists to almost to an epizootic extent in some localities. The grooms often get inoculated and have the horse pox, which saves them the trouble of being vaccinated.

What to do.—It must run its course, so all that is necessary is to give laxative diet; keep the parts clean by bathing with warm water once or twice a day, and grease them over, when dry, to prevent itching and pain from the scabs getting too hard and dry. If the fever should run high and the appetite suffer, and the urine become dark and scanty, give recipe No. 23.

V. Surra.

This is an acute fever of equines, which affects not only horses and cattle, but various other animals—goats and ducks being immune. It has long been known to the English veterinarians, especially in India, occurring just after the rainy season. It is most violent in the low, flooded lands along canals, rivers, and lakes. Its existence in North and South America is limited.

Causes.—The essential cause of the disease is parasitic. It must be borne in mind that the mature parasite appears in the blood, at intervals in swarms, and that examination at a particular time of the day may

fail to detect it, while examinations made earlier or later are successful. The appearance of the disease is at the conclusion of the rainy season, when the waters dry up and become foul. This has led to the idea that the parasite lives in water; but as this is also the time of the year of great swarming and activity of flies, and as horses crowd together, so that the fly with piercing apparatus still wet can pass from horse to horse, the opinion has grown that it is a compulsory parasite, which is transmitted through the bodies of insects.

Symptoms.—In experimental cases a small raised swelling in the seat of inoculation appears within 24 hours, increasing to 2 to 4 inches in diameter, and 1 to 1½ inches high by the fourth day, and loosely connected with the parts beneath. From the fourth to the fourteenth day it decreases in size and softens, and general symptoms set in. In casual cases these general symptoms are the first to be observed. There is a transient fever 102 to 104 degrees, highest toward night, and without preliminary chill, hot mouth and skin, dullness, sluggishness, inappetence, yellowness of the mucosæ, petechiæ on conjunctiva or vulva and sometimes nodules like those of urticaria on the skin. After a day or two these symptoms subside, the temperature is 101 degrees, or below, the mucosæ clear and pale, and the spirit and appetite nearly normal. These slight first paroxysms are rarely seen by the veterinarian, having been looked upon as one of the oft-occurring bilious attacks of the hot climate. The remission lasts for 3 to 10 days, and the second paroxysm sets in, like the first, but even more marked; temperature 102 to 104 degrees, slight catarrh from nose or vulva, it may be stocking of the legs, or pitting swelling under the breast bone or abdomen, or in the sheath. Like the first, the second paroxysm subsides, and after another interval the third sets in to be followed in like manner by a fourth or fifth, and so on if the patient survives. With each the symptoms become more pronounced, the mucosæ are left more pale and bloodless, debility and weakness are greater, emaciation is more marked, oedema of the limbs or body more extensive, hyperthermia may reach 105 degrees, or more, the pulse is weaker and the heart more liable to palpitation, and the respirations may reach 50 to 60 per minute. Ulcers are sometimes found on the tongue, inner sides of the lips, the nose, eyes, the vulva, beginning as epithelial degeneration, followed by superficial erosion and early healing. Sometimes similar erosions appear on the skin. Generative excitement may be present. The submaxillary glands sometimes swell and even suppurate, and discharge a gluey pus. The bowels are usually costive at first, the fæces may be glazed, but in advanced stages they may become soft, pultaceous, and fœtid. The urine, at first normal in amount, becomes later abundant or even profuse. It is at first yellow and turbid, later of a dingy green or greenish yellow. Sometimes it diminishes as the disease advances. It may contain bile, albumen, or even casts,

though the latter appear to be exceptional. The reaction varies, sugar is absent and the parasite has not been found in it. Appetite, though interfered with during paroxysms, remains fair or even voracious in the intervals and the animals may eat to the last. Thirst usually increases with the advance of the disease in keeping with the free urinary secretion. Rumbling and gurgling of the bowels are common and even tympany at times. In the advanced stages the picture is one of great anemia and general dility. When moved the animal will stumble over the slightest obstacle, even the litter, recovering himself with effort and difficulty. If he should fall he is liable to remain down indefinitely, the side next the ground becoming drenched with sweat though there is no general perspiration. The hair becomes increasingly dry, withered, and erect, the skin dry, powdery, rigid and more and more firmly adherent to the bones and muscles, losing all its natural pliancy and mellowness and becomes like that of a dead animal. It is bloodless, and sloughs readily over the prominent bones, where compressed or bruised in lying, owing to the lack of nutritive and reparatory action. The muscles as a whole are wasted to an extreme degree.

Prevention.—The first consideration is to avoid placing equines, and especially horses and mules, in the rainy season in the infecting localities. Oxen and buffaloes can be used in such places with greater impunity. If horses must be used in such localities, place the stables or pickets well apart from marshes and stagnant water. Keep the stables dark during the Surra season, open to light on one side only and with screens in the windows. Make a deep pit for the manure, keep it well darkened and screened and turn every particle of manure into this several times a day so that the stable may be perfectly clean. All rubbish heaps should be similarly dealt with. Flies breed in the manure and beget organic matter. After each sweeping of the stable sprinkle the manure in the pit with some disinfectant, phenic acid, tar water, copperas, etc. Smear the skins of the animals with tar water, coal tar water, naphthalin, daily, if necessary, to prevent the attacks of the flies.

An important consideration is to seclude every animal attacked with Surra. The flies can only carry and inoculate the poison, when there is some source from which they can obtain it. The carcass and all pertaining to it, blood especially, should be promptly and deeply buried and the place thoroughly disinfected.

Treatment.—In well established cases in the horse, ass or mule, no treatment has succeeded in saving the patient. Almost every germicide has been called into requisition, but without good effect. The usual outcome is that the animal dies, and the only claim that can be made is a slight extension of life. This is favored by dry, clean, airy stables, change of water, rich grain and succulent food with iron, arsenic, and other tonics, yet the best that can be said for them is that they have deferred somewhat the inevitable death.

VI. Mycotic Lymphangitis, or Japanese Farcy.

This disease has been known as epizootic lymphangitis, or Japanese farcy; it is a chronic contagious disease, particularly of Horses, caused by a specific organism, and characterized by a suppurative inflammation of the subcutaneous lymph vessels and the neighboring lymph glands. Owing to the fact that this affection does not spread as an epizootic and that its casual factor is a yeastlike fungus, the name mycotic instead of epizootic lymphangitis is suggested. This disease was first described by Italian and French veterinarians, and the specific organism was discovered by Rivolta in 1873. The presence of the disease in the United States was first observed by Pearson in Pennsylvania in 1907, although it is probable that it has existed in various parts of this country for many years. More recently its presence was definitely established in Ohio, Iowa, California, and North Dakota, and there is a probability of

its existence in Indiana and several Western States. The disease is also present in the Philippine Islands, Hawaiian Islands, and Porto Rico.

Causes.—The natural infection is without doubt caused through superficial wounds, such as galls, barbed-wire cuts, or through various stable utensils, harness, bandages, insects, etc. Solipeds are mostly susceptible, but cattle may also be infected.

How to know it.—The inflammation of the lymph vessels is usually first observed on the extremities, especially on one or both hind legs; it may also appear on the fore legs, shoulder, or neck, and more rarely on the rump, udder, and scrotum. The lesions as a rule develop in the tissue adjacent to the



MYCOTIC LYMPHANGITIS.

place of inoculation. In the early stages of the disease the lymph vessels appear very hard and thickened, and along their course hard nodules develop, ranging in size from a pea to a hen's egg. Later these nodules soften, burst spontaneously, and discharge a thick yellowish pus. The surface of the resulting ulcers or abscess cavities soon fills up with exuberant granulations which protrude beyond the surface of the skin, giving a fungoid appearance. The affected extremities are considerably enlarged, similar to cases of simple lymphangitis. In rare cases the

mucous membrane of the nostrils may also become affected, showing yellowish flat elevations and ulcerations, and these may extend by metastasis to internal organs. In cases where the mucous membrane is affected the submaxillary lymph gland may also become enlarged and suppurate.

The constitutional symptoms accompanying this disease are not very marked or may be altogether absent. There is usually only a very slight fever, which seldom runs over 102° F. The appetite is not impaired except in the advanced cases.

The diagnosis is based on the characteristic appearance of the ulcerations, which show exuberant granulation of a bright-red color, inverted edges, and a thick, creamy, glutinous discharge. These manifestations differentiate the disease from glanders, in which the ulcers are craterlike, do not contain exuberant granulations, and the discharge is of a viscous, oily character. In some chronic cases of mycotic lymphangitis, however, the lesions may closely resemble those of farcy, and in these cases the microscopical examination of the pus will disclose the nature of the affection.

What to do.—Treatment consists at the onset of the disease in entire extirpation of the nodules, lymph vessels, and neighboring lymph glands in case the lesions are localized. In cases where the nodules have formed abscesses their opening is recommended, followed by the application of the actual cautery or a 1 to 250 solution of bichloride of mercury. It must be borne in mind that the organism is highly resistant to almost every antiseptic, and the best results will be obtained from the application of a solution of a strong antiseptic following the opening of the lesions.

In the most favorable cases recovery results in from five to seven weeks; as a rule, however, it requires several months.

CHAPTER XV.

DISEASES OF THE URINARY ORGANS.

- I. NEPHRITIS OR INFLAMMATION OF THE KIDNEYS.—II. CONGESTION OF THE KIDNEYS.—III. CYSTITIS OR INFLAMMATION OF THE BLADDER.—IV. PARALYSIS OF THE BLADDER.—V. EVERSION OF THE BLADDER.—VI. SPASM OF THE NECK OF THE BLADDER.—VII. RUPTURE OF THE BLADDER.—VIII. DIABETES INSIPIDUS OR PROFUSE STALING.—IX. HAEMATURIA OR BLOODY URINE.—X. SUPPRESSION OF THE URINE OR DYSURIA.—XI. DRIBBLING OF THE URINE OR ENURESIS.—XII. STRICTURE OF THE URETHRA.—XIII. GONORRHOEA OR GLEET.—XIV. FOUL SHEATH.—XV. URINARY CALCULI.—XVI. MILLET DISEASE OF HORSES.

Diseases and derangements of the urinary organs are far less common than the majority of people suppose. Whenever a horse has the colic or pleurisy, the average horseman attributes the pain to the ravages of bots or to stoppage of the water, and goes to work to start the latter and quiet the former. Many are the nostrums that are given, sometimes harmless and sometimes very irritating and injurious.



AZOTURIA.

Hind quarters paralyzed. Can get up with fore limbs but not with hind limbs.

Many of the diseases mentioned in this chapter are often seen, by a veterinarian who has an extensive, active practice. Diseases of the kidneys are either organic or functional, usually the latter.

I. Nephritis or Inflammation of the Kidneys.

Causes.—The usual causes are too free use of diuretic medicine, and blistering on the back with fly blister; eating musty hay and kiln-dried

oats ; getting chilled by standing under the eaves where water drips upon the loins ; and extension to the kidneys of inflammation of surrounding parts from blows and other injuries.

How to know it.—There will be very profuse sweating, great pain from the inelastic character of the capsule covering the kidneys ; the horse straddles in walking, and is loth to move ; high fever ; elevated pulse, temperature and respiration ; heat and a slight humping up of the back ; great tenderness upon pressure in the region of the loins, especially when applied to the sides just under the transverse spines of the loins ; the pain is colicky in character, and more severe at times than at others ; he looks around to his flanks and is almost continually trying to stale, and passing a little at a time, and that very red and thick, sometimes mixed with blood and pus. It runs on to suppuration, and sometimes to gangrene, and death. When once well set in, it is very hard to control.



INFLAMMATION OF THE KIDNEYS.

What to do.—Examine the case carefully to be certain of the location of the trouble ; then apply hot water rugs across the loins continuously for several days. Give internally a quart of raw linseed oil. As soon as this is well down, give recipe No. 30, and follow it up every two hours. If no relief comes in the course of five or six hours, give copious mucilaginous drinks in the form of flaxseed tea and slippery elm bark. Clothe warmly, to encourage sweating. Freshly-flayed sheepskin may be laid across the loins, or mustard paste may be rubbed into the hair, and the rags applied over it. Feed on short, laxative diet. Avoid diuretics strenuously, especially nitre and spirits of nitre. Give anodyne injections of warm water and one ounce of laudanum, once an hour. Keep the patient quiet and avoid over-feeding.

II. Congestion of the Kidneys.—Azoturia.

This is a constitutional disease affecting all parts through the blood, in which lies the cause of the internal lesions ; but as it affects the kidneys most, and the kidney symptoms being most noticeable to the average observer, we describe it under this head.

Causes.—Too plethoric a condition of the system is the great cause. The blood gets so fat and thick that it interferes with the working of the internal organs, especially the kidneys. The animal is usually fat, but not necessarily so, for it is often seen in horses in strong, working condition, but thin in flesh. In *post mortem* examinations, fat can be seen floating in globules in the blood. It gives rise to thick, coffee-colored, ropy urine.

Like diabetes, this is rather a disease of the liver and blood-forming functions than of the kidneys, but as prominent symptoms are loss of control over the hind limbs and the passage of ropy and dark-colored urine, the common idea is that it is a disorder of the urinary organs. It is a complex affection directly connected with a fullness in the blood of nitrogenized constituents, with extreme nervous and muscular disorder and the excretion of a dense reddish or brownish urine. It is directly connected with high feeding, especially on highly nitrogenized food (oats, beans, peas, vetches, cotton-seed meal), and with a period of idleness in the stall under full rations. The disease is never seen at pasture, rarely under constant daily work, even though the feeding be high, and the attack is usually precipitated by taking the horse from the stable and subjecting it to exercise or work.

On account of its effect on the urine, the disease has been called *Albuminuria*, from the supposed existence of albumen in the urine ; *Azoturia*, from the abundance of urea the urine is thought to contain ; *Plethoric congestion*, from congestions in the system, due to plethora. The latter name is the most appropriate, as there is no albuminous urine and not any great increase of urea in this disease, but the name under which we describe it is readily comprehended and the trouble easily located by the average observer.

How to know it.—The animal is accustomed to hard work or regular exercise, and high feed ; he may be laid up from a nail wound, etc., for a few days or a week ; the feed is kept up the same as though he were at work ; he gets well, and goes out hopping and prancing like a colt, goes about half a mile or so, begins to sweat profusely, lathers up well, gets stiff in the left hind leg, and is inclined to drop it. Then the trouble extends to the other leg ; the horse becomes weak across the loins,

staggers behind, blows hard, and is pressed for breath; he goes on for half a mile or more in this manner, and then comes down in a heap, perfectly helpless, unable to rise, and has the appearance of being paralyzed behind. He is unable to pass urine, which, when drawn off with a catheter, is thick, ropy, dark, coffee-colored. Swelling of the muscles over the loins is seen, and they are very painful and sensitive to pressure, as are also the kidneys, if examined per rectum. There are severe, colicky pains or cramps, in which he will throw himself around, try to get up, will get up forward, and will sometimes drag himself all over the territory allowed him. Inflammation of the kidneys follows, and runs on to suppuration and death in the course of four to fifteen days.

What to do.—Knowing the origin of it to be plethora, the rational treatment is to deplete; give No. 48 internally, and also frequent injections of warm water; apply hot rugs to the loins continuously, and give a great abundance of flax seed tea to drink; if he will not drink it, drench him with it liberally; give nothing to eat for a day or two. Tie his feet if he is inclined to struggle much. When he is able to get up, put him in slings; keep him on short feed; and during convalescence give gentle exercise. Be chary of diuretics. If the case has run on for a week or more, give No. 4, but only three times a day, in a little water. Draw off the urine three times a day, till he can pass it without assistance.

III. Cystitis, or Inflammation of the Bladder.

Causes.—Too free use of diuretic medicine; too free application of fly blisters and turpentine to the back or other extensive surfaces; acrid diuretic plants in the food; prolonged retention and partial decomposition of urine, and irritation from calculi.

How to know it.—Colicky pains; looking around to the flanks; frequent painful evacuation of urine in small quantities, with more or less mucous and epithelium from the lining of the bladder; straining; high fever; mouth hot; respiration and pulse quick; tenderness on pressure just in front of the pubic bone of the pelvis, and same upon pressure in the flanks. The loins are rigid; the bladder is tender to the touch per rectum—or in the mare, per vagina; if examined by running the finger into the bladder, the walls will be found to be thickened; the tail is switched continuously; the gait is stiff and straddling. If the neck of the bladder is affected, the urine escapes involuntarily; if there is a stone in the bladder, it can be felt by inserting the hand into the rectum.

What to do.—Remove the cause, if possible; stop diuretic medicine of all kinds; give large doses of flaxseed tea, and injections of warm water; give a laxative of linseed oil, one pint, and soft diet and pure water at

will; also, a long rest. Avoid diuretic medicine ever after, as the parts once affected are more tender and susceptible.

IV. Paralysis of the Bladder.

Causes.—Long continued distension of the bladder from the urine being held, as in lockjaw, rheumatism or any disease that confines the horse to a lying position.

How to know it.—The urine dribbles away as it is formed, and decomposes, setting free ammonia, which scalds all parts it comes in contact with; the urine scalds the sheath and the inner sides of the thighs and legs. This disease often results in inflammation of the bladder, and sometimes follows partial paralysis.

What to do.—If the trouble originates from paralysis, give that its proper treatment and draw off the urine several times a day with a catheter to prevent distension.

V. Eversion of the Bladder.

Causes.—This affects only females, and results where labor is very protracted, or from straining in cystitis; the bladder is forced back in the pelvis and turned wrong side out.

How to know it.—The bladder will be seen protruding from the lower part of the vulva, a round, red, fleshy looking substance, and the entrance of the ureters (tubes from the kidneys) will be plainly seen near the neck of the bladder, with the urine dripping from them.

What to do.—Bathe the bladder with tepid water and laudanum in the proportion of an ounce of laudanum to a pint of water; then press it gently and continuously till it is returned to its place. Great care will be needed to avoid pushing the fingers through the walls of the bladder, especially after it has been out some time and become swollen. If it is inclined to come out again, after being returned to its place, put on a compress to hold it in.

VI. Spasm of the Neck of the Bladder.

Causes.—It is caused by long retention of urine when the horse is being driven or ridden; nervous irritation; becoming chilled when heated. It is a common occurrence during colic, the urine flowing freely when the colic subsides; males are more subject to it than females.

How to know it.—Frequent attempts to pass water, which is forced out in small quantities by great straining; colicky pains; looking at the flanks; tenderness in the lower back part of the belly; by introducing the hand into the rectum, the bladder will be felt full and distended on the floor of the pelvis.

What to do.—Spread fresh litter under the horse to induce him to pass the urine ; give warm water injections and antispasmodic drenches, such as No. 50 ; gentle pressure on the bladder per rectum is sometimes sufficient, but be very careful not to overdo it for fear of rupture. Pass the catheter up the penis if necessary ; in the case of a mare all that is necessary is to insert one finger into the neck of the bladder.

VII. Rupture of the Bladder.

Causes.—This only occurs in females during parturition when the bladder has failed to be emptied before the labor is begun, and in cases of long continued spasm of the neck of the bladder—especially, if by frequent repetitions of the spasms the walls of it have become weakened and flaccid.

How to know it.—Nervous trembling of the whole body ; accelerated pulse ; cold extremities ; nausea ; abdominal pain that runs on to inflammation and causes death, or the animal dies from the nervous shock. Examination per rectum finds the bladder empty and flaccid ; introduction of the needle of a hypodermic syringe, or a small trocar into the median portion of the belly, will let out urine which is readily recognized by the odor.

Nothing can be done.

VIII. Diabetes Insipidus or Profuse Staling.

This is a superabundant drain of water from the system through the kidneys.

Causes.—Excessive and long continued use of diuretics in acute diseases, especially lung troubles ; acidity of the stomach and chronic indigestion, causing much thirst, so that great quantities of water are drunk. Musty hay and kiln dried oats are frequent causes.

How to know it.—By the excessive thirst ; profuse staling, flooding the stall ; the urine is copious in quantity, frequently voided and as clear as water. Emaciation and hidebound soon follow. The appetite is capricious ; the coat staring ; slight fever ; inclination to lick the walls and mortar to get lime, and to eat the bedding in preference to clean, fresh food. There is weakness, and palpitation of the heart.

What to do.—Give one or two doses of the following recipe :

No. 71.

1 Drachm iodine.

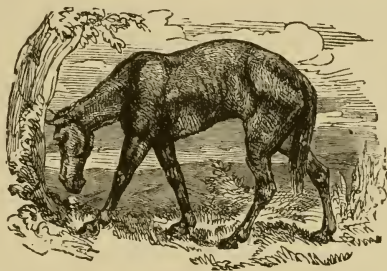
$\frac{1}{2}$ Drachm iodide of potash,

Powder and mix with linseed meal to make a ball.

Give as one dose and repeat it once a day for two or three days ; then give a teaspoonful of bicarbonate of soda in a bran mash, morning and night for a week ; then give recipe No. 37, and give a complete change of food—a run at grass if possible

IX. Hæmaturia or Bloody Urine.

Causes.—This is caused by violence, affecting the loins, kidneys, bladder, etc.; by cancer, tubercle, or abscess in the kidneys; by acrid diuretic plants, etc.



HORSE SUFFERING FROM BLOODY URINE.

What to do.—In case there is a profuse flow of blood, dash cold water over the back. Remove the causes, if they can be located, and give flax-seed tea to drink, and recipe No 70, in doses of two tablespoonfuls, three times a day.

X. Suppression of the Urine, or Dysuria.

Causes.—This is retention of the urine from various causes, such as contraction of the sphincter of the bladder; enlargement of the prostatic gland; stricture of the urethra; bean in the head of the penis, and calculi.

What to do.—Pass in the catheter to empty the bladder, and then endeavor, if possible, to find the cause and remove it. If it is from enlargement of the prostatic gland, give No. 66; if from contraction of sphincter of the neck of the bladder, refer to the treatment for spasms of the neck of the bladder; if from stricture, refer to the article on that subject; if from a bean in the head of the penis, oil your fingers well and remove it; if it is from calculi, refer to that subject.

XI. Dribbling of the Urine, or Enuresis.

In this case the urine dribbles away involuntarily. It may come from weakness of the sphincter of the bladder, or from injury to it by the catheter, or from paralysis of the bladder. Care should be taken, when passing in the catheter, to pass one hand into the rectum to guide the point over the curve. It may come from calculi; if so, remove them. If it comes from weakness, give a change of food, and No. 37 as a tonic.

XII. Stricture of the Urethra.

Causes.—This is caused by irritating ingredients in the urine, and by strong astringent injections used in gleet; or by the healing of ulcers in neglected gleet.

How to know it.—The urine is passed in a very fine stream; the passage requires a long time, and is attended with pain. There are frequent painful erections.

What to do.—Pass in, daily, a catheter, beginning with one small enough to pass the stricture, and increase the size of it from day to day, pushing it by the stricture with gentle pressure.

XIII. Gonorrhœa.

Causes.—This is inflammation of the urethra from irritating substances in the urine; excessive copulation; masturbation; connection with a newly delivered mare or one that has an irritating discharge from the womb; mechanical injury to the penis, and irritation from the passage or arrest of small stones or gravel. It is mostly confined to stallions.

How to know it.—By swelling and soreness in the sheath and penis; painful, slow urination, frequently interrupted and sent in jets, owing to the pain; more or less discharge of pus, which will be seen around the head of the penis.

What to do.—Give a pint of raw linseed oil as a laxative, and foment the sore part with hot water; rinse out any gravel, and inject a lotion made as follows:

No. 72.	$\frac{1}{2}$ Ounce sugar of lead,
	1 Ounce vinegar,
	1 Quart water.
	Mix.

Inject a little once a day. If it is necessary to continue this longer than a week, change to

No. 73.	15 Grains nitrate of silver,
	$\frac{1}{2}$ Pint water.
	Mix.

Inject a little twice a day. Feed on soft food.

XIV. Foul Sheath.

The sheath of most horses needs cleaning occasionally. The glands in the skin secrete a fluid to lubricate the parts, and at times it is secreted in larger quantities than at other times, and accumulates in a gummy, black substance in the sheath. Wash it out carefully with soap and warm water, being careful not to use any violence in drawing down the yard,

and particularly careful not to scratch the parts with the finger nails. If this occurs the yard may swell to enormous proportions; if so, bathe it with warm water and suspend it in a wide bandage passed over the loins. Repeat the bathing two or three times a day. Give gentle exercise; and when the swelling is nearly gone, oil it with olive oil.

XV. Urinary Calculi.

Stones or calculi in the urinary apparatus differ in size, chemical composition and location. Sometimes they attain to very large sizes; sometimes several small ones exist in the same place, and sometimes the deposit is sand-like, the granules not uniting to form a stone.

Their chemical composition differs according to the nature of the food. The calculi of herbivorous or grazing animals are composed mostly of the carbonates, while those of carnivorous or flesh eating animals consist mainly of the phosphates. The calculi of omnivorous animals partake of the character of the two kinds just mentioned. They will be more largely composed of the carbonates or of the phosphates according to the character of the food and water taken.

Causes.—The carbonates of lime and magnesia are the principal components of the calculi of horses and cattle; they are due to the large proportion of vegetable acids in the food. These vegetable acids become transformed into carbonic acid, which unites with the lime and magnesia in the blood, thus forming calculi. The tendencies to form calculi from the food are strengthened by the following accessory causes: Scarcity of water; disinclination to drink; excessive loss of water from the system by diarrhoea and dysentery or profuse sweating; feverish conditions, giving rise to scanty secretions of urine; dry winter fodder; and hard drinking water.

A solid substance of some kind for a nucleus or starting point is usually necessary to their formation; around this nucleus the salts crystallize in concentric layers. The nucleus may be a particle of mucus, fibrine or blood, or a foreign body introduced with the catheter.

The locations in which they may be found are the kidneys, ureters (the tubes leading to the bladder), the bladder, the urethra and the fossa of the glans penis.

How to know it.—Those in the kidneys and ureters cause colicky pains, straddling gait, tender loins, and sometimes blood in the urine. Those in the ureters can sometimes be felt by the hand introduced into the rectum.

Those in the bladder get into the passage and obstruct the urine occasionally, in which case they give rise to frequent straining efforts to pass urine; the urine escapes in dribblets and jets, with frequent sudden arrests of the flow; but if the stone does not get into the passage, the flow is not

checked. Blood, in clots, may be passed from wounding of the mucous membrane of the bladder, by the stone. Examination by the hand, per rectum, will determine its existence. In the female, it can sometimes be reached with the finger.

What to do.—There is no satisfactory treatment in cases where the location of the stone is out of reach. Those in the bladder and urethra can be removed by either breaking them down and washing the fragments out (lithotrity), or they may be removed whole (lithotomy); both operations will be found described in the chapter on operations.

Prevention.—It is well to guard against the formation of them in the first instance, and to prevent their return when removed. If any fault exists in the feeding, correct it; give a reasonable amount of common salt, twice a week to horses, and to cattle three times a week; also give an abundant supply of good water. If the water is hard, put a little caustic soda or potash into it once a day, or a little hard wood ashes. Give roots to eat if in winter, and grass in summer; give half an ounce of tincture of gentian morning and night for a fortnight, or a tablespoonful of powdered gentian or quassia morning and night in soft food.

Wounds:—For treatment of lacerated wounds, see page 360. But sometimes the skin is not broken, the flesh is very much bruised, resulting in pollevis, fistulous withers, sweeney or some other severe affection.

As soon as observed, bathe with hot water two or three times per day for several minutes, wipe dry and apply venice turpentine, driving it in with a hot iron held close to the wound

If you find it is going to head, put on flaxseed poultice to assist, and on opening, treat as any other fistulous sore.

Should the surface wound be of long standing and will not heal, cauterize it with sulphuric acid, using just enough to moisten, oil with vaseline to protect healthy tissue and bathe with No. 7 three times per day.

A thickening is often seen after healing. To remove it, bathe with hot water as above and apply No. 14 until fairly well blistered, apply fresh lard until healed and repeat the process until satisfactory results are obtained.

If proud flesh appears, put on powdered blue vitriol taking care to tie the horse so that he can not get at the wound.

XVI. Millet Disease of Horses.

In many sections of the West and Middle West millet is a common hay crop. It is harvested and handled in the same manner as other hay. The usual practice is to harvest the crop before the heads are fully ripe, as there is a popular belief that the ripe heads are injurious to horses. Several years ago the North Dakota Station reported that a large number of horses had been affected with so-called "millet disease." This was characterized by symptoms resembling rheumatism and derangement of the urinary system. The name "millet disease" was adopted from the fact that nearly 100 per cent of the horses affected had been fed upon millet. In the few cases in which the disease was said to occur when millet was not fed the symptoms of derangement of the kidneys were absent.

A number of cases of millet disease were investigated by the North Dakota Station. After feeding considerable quantities of millet the urine for a time was very abundantly secreted. Lameness and rheumatic symptoms soon occurred, and were accompanied by a suppression of urine. Later the lameness became very severe, and fever was observed also. A considerable proportion of the cases terminated fatally.

Very recently this station has published the results of further experiments on the subject of feeding millet. Two tests were made. In the first trial two geldings in good health were fed hay and grain for about two weeks. Millet was then substituted for hay for about ten days. The same ration as at the beginning was then fed for four days. All the horses were driven daily for exercise. The symptoms of lameness accompanied by suppressed urine, previously noted, were observed in these cases also.

The second test was similar to the first, and was made with two mares. One of the mares became very lame and could hardly stand, and suffered from time to time from retention of the urine. She was killed and post-mortem examination of the carcass showed a very diseased condition. The other mare did not show as marked symptoms during the test. However, when fed millet for about three months she would become so lame in the joints of the hind legs that it was almost impossible for her to walk. When feeding millet was discontinued she would recover. The lameness was again produced by millet feeding. After about two years of alternate periods of millet and hay feeding she became practically worthless.

From these experiments and observations it would appear that feeding millet alone as a coarse fodder is injurious to horses. It produces an increased action of the kidneys, and causes lameness and swelling of the joints. It causes an infusion of blood into the joints, and destroys the texture of the bone, rendering it soft and less tenacious, so that the ligaments and muscles are easily torn loose. Feeding millet produces millet disease, the specific cause to which the dangerous properties of millet are due has not yet been discovered.

CHAPTER XVI.
MALARIAL FEVER IN HORSES
OR
PERNICIOUS ANEMIA, SWAMP FEVER, OR SURRA.

I. DEFINITION.—II. ETIOLOGY.—III. SYMPTOMS.—IV. DIAGNOSIS.—
V. FIELD WORK.—VI. TREATMENT.—VII. CONCLUSIONS.

I. Definition.

Pernicious anemia, or infectious anemia, is known under various names as swamp fever, American surra, and plain paralysis. The term perni-



AN ACUTE CASE, FIRST STAGE.

cious anemia seems the most suitable one to use, in the light of present knowledge of the disease.

There has been a great deal of investigation of this disease. At the present time the Bureau of Animal Industry is working in co-operation with the Agricultural experiment stations of various states. The disease is found from Manitoba to the Gulf of Mexico. It has been proven conclusively that this disease is due to an ultra-microscopical organism capable of passing through the finest porcelain filters. It is found most prevalent in low, marshy localities, although the disease is seen on higher

altitudes. It appears most frequently during the months from March to October, but may appear any time of the year, and affects only the equine species.

II. Cause.

The virus, in blood, drawn from an infected animal, has been found active after twenty-four hours. Five Cc. injected into a healthy animal has produced the disease.

Dr. Darling of the hospital force of the canal zone at the Isthmus of Panama claims to have found a germ in all cases diagnosed as swamp fever by veterinarians at the zone.



A SECOND ATTACK, SECOND STAGE.

The period of incubation after inoculation is from ten days to six weeks. The onset of pernicious anemia is marked by an elevation of temperature. If the mucous membrane is involved, it will run a chronic course, lasting from six weeks to six months, or even longer. I have a case in mind which lasted twenty-two months. It was under treatment part of the time.

It is considered that flies, mosquitoes, and internal parasites act as intermediate hosts for the parasite that causes pernicious anemia.

The disease is characterized by a progressive anemia, remittent fever, excessive urination and a gradual emaciation in spite of a good appetite. The patient appears dull, listless, tires very easily, and exhibits more or less stiffness of hind limbs.

The temperature at first 103° F. or higher after a while subsides to run even higher later. Death is due to exhaustion or unconsciousness. There may be either diarrhea or constipation—more frequently the latter.

All mucous membranes are pale in color, and there is more or less weakness of all pendulent parts of the abdomen.

Lesions noted on the carcass are anemia and extreme emaciation. The absence of adipose tissue makes the skin adhere to the body. Purple or livid spots are found on the heart muscle, and on other visceral organs. A plastic exudate is found in the thoracic cavity. There is a decrease of red blood corpuscles, and increase of white corpuscles.



A CHRONIC CASE, THIRD STAGE.

Says Dr. A. T. Peters of the Nebraska Agricultural station: Many of the farmers call the disease "Typhoid Fever," for it resembles this fever very much. The manner in which the disease is contracted by horses is not definitely understood. In the last few years, the Veterinarians in the Philippines have discovered a disease, prevalent in India under the name of "surra," the description of which corresponds very much to that of malarial fever of horses in this country, with the exception that bacteriologists have not been able to find the surra parasite in the blood of affected animals in this country. As the parasite of surra is very easily detected in the blood of affected animals, and as we have not been able to discover it, the conclusion seems reasonable that the diseases are not identical. It is difficult to ascertain how the disease first made its appearance in this country. We find it on the marshy pastures during

very wet seasons. It is the general opinion of those who have studied the disease that it is caused by feeding on certain low, marshy pastures and on hay that comes from such pastures. Whatever its origin, the disease has spread on these pastures during the last few years. Horses die from this disease on the Missouri river bottom and in the Elkhorn valley and farther up in the western part of the state. In these districts the loss is very great, especially in wet seasons, such as we have had in the last few years. To the stockman the loss is very heavy, for when it once makes its appearance on a ranch, it is very apt to recur, and carry off every horse. Many ranchmen in these districts lost all of their horses and were seriously crippled in finishing up their season's work, many farmers losing from two to eight head of horses. This is the most serious disease among horses that this state has been called upon to investigate.

III. Symptoms.

The disease usually starts in with a fever of the recurrent type. Following this is the symptom of weakness. The horses become tired easily. They apparently have no life and perform their usual work with great difficulty. The mucous membranes of the mouth and eyes become very pale. After the animals have shown these symptoms for a few days, one will notice a staggering gait. They become weak over the loins, so that farmers suspect some kidney trouble. They drag their legs. During these first symptoms the horses do not apparently lose their appetite, eating ravenously, but growing thinner and weaker all the time. The temperature becomes more elevated, running as high as 103° to 106°. The variation in temperature is one of the characteristic symptoms. It may remain high for several days and then drop down, only to rise again. In this condition of changing temperature the horses become too weak to work. They lose flesh very rapidly and are usually laid off from work. It may occur that the animal will improve for a week or ten days, only to have another attack more severe than the first one. Horses may have two or three attacks and death finally follows, either from heart failure or from exhaustion. The ranchmen have observed that when they feed their horses all they want while they are sick with this disease, death is certain, but that if they feed them sparingly they may recover, but usually have another attack. In the early stages of the disease the pulse is always very rapid, while in the latter stages it is very weak. Horses may linger with this disease for several months. The writer has observed some to live three months. As a rule, horses live from two to three weeks. It is only occasionally that animals recover. Besides the above symptoms, there is a swelling of the legs. This is a symptom that is not always observed, and then,

only in the latter stages of the disease. This swelling may also be noticed under the abdomen. The swelling indicates a very poor circulation, and is a very bad symptom. There are also found petechiae (little blood spots) on the mucous membranes. These are especially found on the surface membrane of the eye. As the disease advances, the color of these spots become darker, resembling that in mortification, and gives the observer a very good index of the progress of the case. Whenever these spots are found on the mucous membrane of the eye, the case almost always proves fatal. Another marked symptom is the increase of the urine. Large quantities of urine are secreted. This is also a serious symptom.

IV. Diagnosis.

This disease is not very difficult to diagnose, at least not in the latter stages of the disease. In the early stages it may be mistaken for influenza or pneumonia, but when one has seen a case in the advanced stages, then it is not so difficult. However, it is well for one who is inexperienced to defer judgment until the animal has been examined two or three times on that many days. If one takes into consideration the good appetite with continual loss of flesh, the pale mucous membranes, and the peculiar pulse, he can diagnose without much trouble.

Prognosis.—The prognosis of this disease is very unfavorable. Some ranchmen and veterinarians claim that the death rate runs from 50 to 75 per cent, while others claim even a higher percentage. The writer is of the opinion that a very small per cent of the animals recover. We have observed that where farmers have carefully nursed their animals they appeared to recover, only to have another attack which seemed to be more severe, death finally resulting. The writer has never seen a thoroughly cured animal since he has observed this disease.

V. Field Work.

The disease was first observed by this station in 1902 in this state. Since that time a great many horses have been lost.

The field work consisted in visiting several ranches on which a number of horses had died, so as to study the conditions. It was our aim to make post mortem examinations and to treat animals that were affected. In the majority of cases that came under our observation the animals were in the advanced stages of the disease.

Last July the writer visited a number of ranches, and also held post mortem examinations on diseased animals. We found that the animals were all greatly emaciated and the mucous membranes very pale; and in all cases

we found the characteristic blood spots on the mucous membrane of the eye. These blood spots were more pronounced in some cases than in others, due to the severity of the attack. Some blood counts were made from the diseased animals. The red corpuscles ran as low as 1,800,000 to 2,200,000, while the normal for a healthy animal is about 7,500,000 red corpuscles, which explains why the affected animals emaciate and become pale so very rapidly. The post mortem examination also showed a large number of worms known as the tetracanthum. This worm was found more abundant in horses that showed slight symptoms or were in the early stages of the disease, and was not found so abundant in the chronic cases. It was always found in the colon and the intestines. In none of the specimens that were examined were we able to find this worm in the circulation. It is of importance to note that, as stated, in advanced, long-standing chronic cases, when a post mortem is held, few if any of these parasites are found. This may possibly be explained by the severe emaciation that the animal has undergone, the blood being in such poor condition that possibly it had no nutritive value, thus causing the parasites to leave their hosts. In one post mortem examination where, according to the owner's statement, the horse had been affected twenty-one days, we could not find any of these worms. The organs in the abdominal cavity were practically normal except the kidneys, which were very much enlarged, and showed plainly chronic lesions of nephritis (inflammation of the kidneys.)

Laboratory Experiments.—Cultures were made from the contents of the spleen, blood, kidneys, and urine. These cultures were inoculated into smaller animals, but without any results.

VI. Treatment.

The treatment of this disease has not been very satisfactory, which is largely due to the fact that we have no definite knowledge as to the true cause of the disease. The treatment consisted in using gasoline, creolin and creosote to cleanse out the stomach of the intestinal parasites. In addition to this, fever remedies were used, such as quinine, nux vomica, digitalis, and the like, followed up with a general tonic, such as Fowler's solution, but with no universal success.

At this time the Station is giving attention to the method by which these animals become infected. Possibly it may be in the same way that sheep and cattle become infected with the small parasite known as the stomach worm. Embryos of worms have been found on blades of grass and are taken up by stock when grazing. As soon as the definite cause of infection has been learned, then possibly a cure may be forthcoming.

VII. Conclusions.

Since we have no definite knowledge of how the animal becomes infected, and from the fact that all medicinal treatment so far employed has given no uniform success, attention should be given to the prevention, and especially to the mode of infection, as stated before.

A very capable authority gives the following facts as to mortality and treatment:

The prognosis should be guarded. Most practitioners report about fifty per cent. mortality, but if the horses were treated according to the veterinarian's direction it is doubtful if the mortality would be more than twenty-five per cent. Drs. Francis and Marsteller, of Texas, have issued a bulletin in which they hold that an animal that has had the disease is always infectious. This statement needs further experimental support.

In the treatment of the disease the affected animals should be kept absolutely at rest, they should not even be led out of their stalls to the watering trough. Sunshine has a decided injurious effect upon the diseased animals; they should be kept in a comfortable stall.

In the acute type the temperature should be diminished by cold baths. Water may be safely and conveniently applied with a hose. When water is not available for a bath, frequent rectal injections of cool water should be resorted to. Stimulants should be given, the dosage depending upon the requirement of the case. Arsenic appears to be a very reliable agent in this disease. It is usually given as Fowler's solution, the dosage varying somewhat, though generally speaking, large doses should be given. Any ordinary adult horse should receive from two to three ounces of Fowler's solution daily until the temperature becomes normal. Tonics should be prescribed for at least two weeks after the animal has apparently returned to normal. In the chronic form, the temperature should be kept as near normal as possible by baths or rectal injections. Stimulants should be given at least three times daily, conjoined with Fowler's solution, giving of the latter not less than two ounces daily. The Fowler solution may be suspended for a day or two if there are signs of arsenical poisoning. This line of treatment continued for from four to six weeks apparently completely destroys the causative agent of the disease, or, at least, the animals recover.

CHAPTER XVII.

DISEASES OF THE GENERATIVE ORGANS.

I. SYMPTOMS.—II. TREATMENT.—III. SARCOCELE.—IV. VARICOCELE.—V. DEGENERATION OF THE TESTICLES.—VI. WARTS ON THE PENIS.—VII. DEGENERATION OF PENIS.—VIII. EXTRAVASATION OF BLOOD IN THE PENIS.—IX. PARALYSIS OF THE PENIS.—X. MALADIE DU COÏT, OR DOURINE.

CONGESTION AND INFLAMMATION OF THE TESTICLES, OR ORCHITIS.

In the prime of life, in vigorous health, and on stimulating food, stallions are subject to congestion of the testicles, says Prof. James Law, which become swollen, hot, and tender, but without any active inflammation. A reduction of the grain in the feed, the administration of 1 or 2 ounces of Glauber's salts daily in the food, and the bathing of the affected organs daily with tepid water or alum water will usually restore them to a healthy condition.

When the factors producing congestion are extraordinarily potent, when there has been frequent copulation and heavy grain feeding, when the weather is warm and the animal has had little exercise, and when the proximity of other horses or mares excite the generative instinct without gratification this congestion may grow to actual inflammation. Among the other causes of orchitis are blows and penetrating wounds implicating the testicles, abrasions of the scrotum by a chain or rope passing inside the thigh, contusions and frictions on the gland under rapid paces or heavy draft, compression of the blood vessels of the spermatic cord by the inguinal ring under the same circumstances, and, finally, sympathetic disturbance in cases of disease of the kidneys, bladder, or urethra. Stimulants of the generative functions, like rue, savin, tansy, cantharides, and damiana, may also be accessory causes of congestion and inflammation. Finally, certain specific diseases like *maladie du coït*, glanders, and tuberculosis, localized in the testicles, will cause inflammation.

I. Symptoms.

Apart from actual wounds of the parts, the symptoms of orchitis are swelling, heat, and tenderness of the testicles, straddling with the hind legs alike in standing and walking, stiffness and dragging of the hind limbs or of the limb on the affected side, arching of the loins, abdominal pain, manifested by glancing back at the flank, with more or less fever, elevated body temperature, accelerated pulse and breathing, inappetence, and dullness. In bad cases the scanty urine may be reddish and the

swelling may extend to the skin and envelopes of the testicle, which may become thickened and doughy, pitting on pressure. The swelling may be so much greater in the convoluted excretory duct along the upper border of the testicle as to suggest the presence of a second stone. Even in the more violent attacks the intense suffering abates somewhat on the second or third day. If it lasts longer it is likely to give rise to the formation of matter (abscess). In exceptional cases the testicle is struck with gangrene, or death. Improvement may go on slowly to complete recovery, or the malady may subside into a subacute and chronic form with induration. Matter (abscess) may be recognized by the presence of a soft spot, where pressure with two fingers will detect fluctuation from one to the other. When there is liquid exudation into the scrotum, or sack, fluctuation may also be felt, but the liquid can be made out to be around the testicle and can be pressed up into the abdomen through the inguinal canal. When abscess occurs in the cord the matter may escape into the scrotal sac and cavity of the abdomen and pyemia may follow.

II. Treatment.

Treatment consists in perfect rest and quietude, the administration of a purgative (1 to 1½ pounds Glauber's salts), and the local application of an astringent lotion (acetate of lead 2 drachms, extract of belladonna 2 drachms, and water 1 quart) upon soft rags or cotton wool, kept in contact with the part by a suspensory bandage. This bandage, of great value for support, may be made nearly triangular and tied to a girth around the loins and to the upper part of the same surcingle by two bands carried backward and upward between the thighs. In severe cases scarifications one-fourth inch deep serve to relieve vascular tension. When abscess is threatened its formation may be favored by warm fomentations or poultices, and on the occurrence of fluctuation the knife may be employed to give free escape to the pus. The resulting cavity may be injected daily with a weak carbolic-acid lotion, or salol may be introduced. The same agents may be used on a gland threatened with gangrene, but its prompt removal by castration is to be preferred, antiseptics being applied freely to the resulting cavity.

III. Sarcocoele.

This is an enlarged and indurated condition of the gland, resulting from chronic inflammation, though it is often associated with a specific deposit, like glanders. In this condition the natural structure of the gland has given place to embryonal tissue (small round cells, with a few fibrous bundles), and its restoration to health is very improbable. Apart from active inflammation, it may increase very slowly. The diseased testicle is

enlarged, firm, non-elastic, and comparatively insensible. The skin of the scrotum is tense, and it may be edematous (pitting on pressure), as are the deeper envelopes and spermatic cord. If liquid is present in the sac, the symptoms are masked somewhat. As it increases it causes awkward straddling, dragging movement of the hind limbs, or lameness on the affected side. The spermatic cord often increases at the same time with the testicle, and the inguinal ring being thereby stretched and enlarged a portion of intestine may escape into the sac, complicating the disease with hernia.

The only rational and effective treatment is castration, and even this may not succeed when the disease is specific.

IV. Varicocele.

This is an enlargement of the venous network of the spermatic cord, and gives rise to general thickening of the cord from the testicle up to the ring. The same astringent dressings may be tried as in orchitis, and, this failing, castration may be resorted to.

V. Degeneration of the Testicles.

The testicles may become the seat of fibrous, calcareous, fatty, cartilaginous, or cystic degeneration, for all of which the appropriate treatment is castration. They also become the seat of cancer, glanders, or tuberculosis, and castration is requisite, though with less hope of arresting the disease. Finally, they may become infested with cystic tapeworms or larval stages of the armed roundworm (*Strongylus equinus*).

VI. Warts on the Penis.

These are best removed by seizing them between the thumb and forefinger and twisting them off. Or they may be cut off with scissors and the roots cauterized with nitrate of silver.

VII. Degeneration of Penis.

The penis of the horse is subject to great cauliflower-like growths on its free end, which extend back into the substance of the organ, obstruct the passage of urine, and cause very fetid discharges. The only resort is to cut them off, together with whatever portion of the penis has become diseased and indurated. The operation, which should be performed by a veterinary surgeon, consists in cutting through the organ from its upper to its lower aspect, twisting or tying the two dorsal arteries, and leaving the urethra longer by half an inch to 1 inch than the adjacent structures.

VIII. Extravasation of Blood in the Penis.

As a result of kicks, blows, or of forcible striking of the yard on the thighs of the mare which it has failed to enter, the penis may become the seat of effusion of blood from one or more ruptured blood vessels. This gives rise to a more or less extensive swelling on one or more sides, followed by some heat and inflammation, and on recovery a serious curving of the organ. The treatment in the early stages may be the application of lotions, of alum or other astringents, to limit the amount of effusion and favor absorption. The penis should be suspended in a sling.

IX. Paralysis of the Penis.

This results from blows and other injuries, and also in some cases from too frequent and exhausting service. The yard hangs from the sheath, flaccid, pendulous, and often cold. The passage of urine occurs with lessened force, and especially without the final jets. In cases of local injury the inflammation should first be subdued by astringent and emollient lotions, and in all cases the system should be invigorated by nourishing diet, while 30-grain doses of *nux vomica* are given twice a day. Finally, a weak current of electricity sent through the penis from just beneath the anus to the free portion of the yard, continued for ten or fifteen minutes and repeated daily, may prove successful.

X. *Maladie Du Coit, or Dourine.*

This is propagated, like syphilis, by the act of copulation and affects stallions and mares. It has long been known in northern Africa, Arabia, and Continental Europe. It was imported into Illinois in 1882 in a Percheron horse.

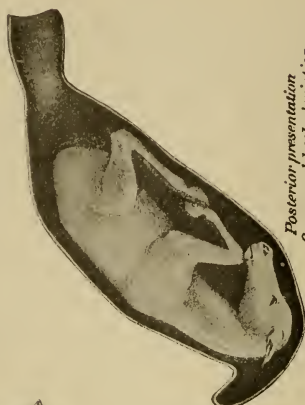
From one to ten days after copulation, or in stallions it may be after some weeks, there is irritation, swelling, and a livid redness of the external organs of generation, sometimes followed by the eruption of small blisters one-fifth of an inch across on the penis, the vulva, clitoris, and the vagina, and the consequent rupture of these vesicles and the formation of ulcers or small open sores. Vesicles have not been noticed in this disease in the dry climate of Illinois. In the mare there is frequent contraction of the vulva, urination, and the discharge of a watery and later a thick viscid liquid of a whitish, yellowish, or reddish color, which collects on and soils the tail. The swelling of the vulva increases and decreases alternately, affecting one part more than another and giving a distorted appearance to the opening. The affection of the skin leads to the appearance of circular white spots, which may remain distinct or coalesce into extensive patches which persist for months. This, with the soiled tail, red, swollen, puckered, and distorted vulva, and an increasing weakness and paralysis

of the hind limbs, serves to characterize the affection. The mare rarely breeds, but will take the male, and thus propagate the disease. The disease winds up with great emaciation and stupidity and death in four months to two years. In horses which serve few mares there may be only swelling of the sheath for a year, but with frequent copulation the progress is more rapid. The penis may be enlarged, shrunken, or distorted; the testicles are usually pendent and may be enlarged or wasted and flabby; the skin, as in the mare, shows white spots and patches. Later the penis becomes partially paralyzed and hangs out of the sheath; swelling of the adjacent lymphatic glands (in the groin), and even of distant ones, and of the skin appears, and the hind limbs become weak and unsteady. In some instances the glands under the jaw swell, and a discharge flows from the nose, as in glanders. In other cases the itching of the skin leads to gnawing and extensive sores. Weakness, emaciation, and stupidity increase until death, in fatal cases, yet the sexual desire does not seem to fail. A stallion without sense to eat, except when food was put in his mouth, would still neigh and seek to follow mares. In mild cases an apparent recovery may ensue, and through such animals the disease is propagated to new localities to be roused into activity and extension under the stimulus of service. The diseased nerve centers are the seat of cryptogamic growths.

Treatment of the malady has proved eminently unsatisfactory. It belongs to the pure contagious diseases, and should be stamped out by the remorseless slaughter or castration of every horse or mare that has had sexual congress with a diseased animal.



*Posterior presentation
Right leg bent on itself*



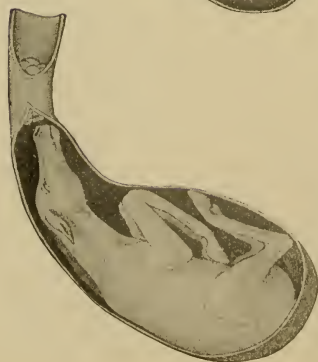
*Posterior presentation
Croup and hock deviation*



*Ant. presentation
Limbs on the neck*



*Ant and dorsal presentation
Left leg bent on itself*



*Anterior presentation
Limbs bent on breast*



*Ant presentation
Limbs bent on abdomen*

ABNORMAL PRESENTATIONS.

CHAPTER XVIII.

PARTURITION.

I. NATURAL PARTURITION.—II. DIFFERENT PRESENTATIONS.—III. ATTENTION TO THE MOTHER.—IV. ATTENTION TO THE FOAL.—V. DIFFICULT PARTURITION IN THE MARE AND COW COMPARED.—VI. DIFFICULTIES DUE TO THE MOTHER.—VII. DIFFICULTIES DUE TO THE FOAL.—VIII. OBSTETRIC INSTRUMENTS.—IX. WHEN THE FOAL IS BORN DEAD, OR THE AFTER-BIRTH RETAINED.—X. THE UMBILICAL CORD OF FOAL.—XI. VARIOUS PRESENTATIONS ILLUSTRATED.—XII. VARIOUS POSITIONS OF THE FOAL.—XIII. DORSO-LUMBAR PRESENTATION.—XIV. STERNO-ABDOMINAL PRESENTATION.—XV. MECHANISM OF PARTURITION.—XVI. MECHANISM OF PARTURITION IN THE ANTERIOR VERTEBRO-SACRAL POSITION.—XVII. MECHANISM OF PARTURITION IN THE ANTERIOR VERTEBRO-PUBIC POSITION.—XVIII. MECHANISM OF PARTURITION IN THE ANTERIOR VERTEBRO-ILIAL POSITIONS.—XIX. MECHANISM OF PARTURITION IN THE POSTERIOR LUMBO-SACRAL POSITION.—XX. NECESSARY AID IN NORMAL PARTURITION.—XXI. SPAYING, OR CASTRATION OF THE MARE.

I. Natural Parturition.

This branch of our subject needs but little consideration, the various phases of labor being so well known to all breeders. However, a brief outline of the different stages of labor will not be out of place.

Preliminary Stage.—This is announced by several well-marked features. The milk glands of the mare, which are naturally small, become large, tense and painful; in many instances the swelling extends to the thighs up to the vulva, and along the belly to the breast bone. The vulva becomes enlarged, soft, and its inner lining of a bright red color. There is also a discharge of sticky mucus which lubricates the passage, and when in large quantity soils the hock and tail. The abdomen sinks near the critical period, giving the croup a sunken appearance.

Fleming, in his justly celebrated work on veterinary obstetrics, says: "As parturition draws nearer, these phenomena are more marked. The animal also begins to be restless, and continually agitated; if feeding, it stops for some moments, as if listening to some sound only audible to itself, or, as if experiencing some strange internal sensation for the first time, and which may be the commencing or preparatory contractions of the uterus. Not infrequently the animal lies down and gets up again, as if suffering from colic. Some are quite mute, though anxious and uneasy; while others, in addition to exhibiting restlessness and distress, utter a half-stifled cry of pain, and violently whisk the tail."

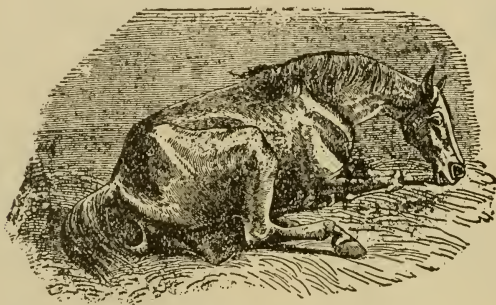
The position taken during labor in the mare and cow is usually the standing one, but the recumbent position, here illustrated, is not infrequent; the mare, resting on the breast bone, strains and raises up somewhat on the hind legs at the same time.

Dilatation of the Neck of the Womb.—This commences towards the latter part of the former stage. It is marked by increased signs of pain. It is a gradual process, the pain at first lasting for a few seconds;

later, when the membranes are forcibly dilating the neck, it is continuous, the womb and vagina becoming, by the dilatation, one continuous cavity.

Expulsion of the Fœtus.—The water-bag, having dilated the neck of the womb, passes outward and appears at the vulva. The severe straining soon ruptures it, allowing the feet of the fœtus to protrude. The head, resting in most cases as described in the next section, aids in dilating the parts. Nature usually allows a short rest after forcing the head through, to prepare for the severest part, the passage of the shoulders, after which all is easy. The umbilical cord is usually broken when the foal falls to the ground, and it is freed from its coverings.

Expulsion of the After-birth.—This usually takes place a few minutes after birth, but occasionally not for a longer time. If not detached within



RECUMBENT POSITION.

The large water-bag has just appeared.

a few hours it becomes a serious matter, as in removing it hemorrhage is liable to occur. During and after the expulsion of the membranes, the womb rapidly contracts and diminishes in size; the neck of the womb also grows smaller, and in a short time assumes normal proportions.

In the cow the placenta (after-birth) may be retained for one, two or three days without causing any trouble, owing to its formation being different from that of the mare.

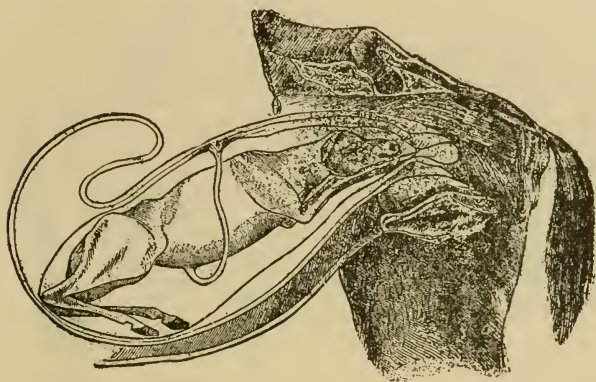
II. The Different Presentations.

The variety of positions in which the fœtus may be presented is surprising, but there are four presentations to which, because of their being by far the most frequent, we will call special attention, namely: (1) the

head presenting, (2) the tail presenting, (3) the right transverse position, and (4) the left transverse position.

Head Presentation.—This is the most common, and the one that is attended with the least difficulty. It is depicted with great accuracy in our illustration. The fore feet are extended, and the head rests upon them; thus they form a sort of cone, which acts as a dilator of the passage, greatly facilitating the delivery. Many authors claim this to be the only “natural” form of delivery.

Tail Presentation.—This is another frequent form, yet much less so than the one just considered. Here the hind feet protrude, with the tail resting on them. This form of delivery is not as easy as the first, on account of there being no gradual dilatation to permit the passage of the



HEAD PRESENTATION.

large croup. It is easily recognized by feeling the hocks and the tail of the fœtus.

Right Transverse Position.—This should not be considered a natural form (though many veterinarians think otherwise), but rather as a mal-presentation. The head is turned to the right side of the mother. It may be distinguished by feeling the colt's withers, mane and head.

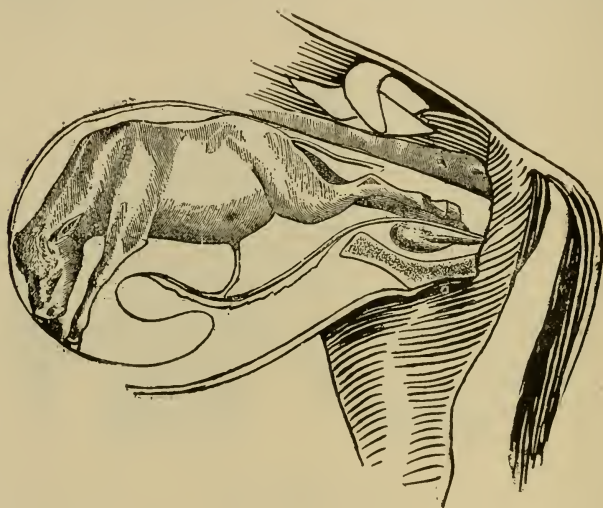
Left Transverse Position.—This is the reverse of the preceding. The position is head to the left, as may be recognized by feeling the colt's withers, and up along his neck.

All other presentations may, in a general way, be regarded as modifications of the four above described.

III. Attention to the Mother.

In this section we shall run over a few leading items as to the care of the mother. For at least three or four weeks previous to the period of foaling, the mare should be allowed gentle exercise, as a safeguard against abortion. As the critical period approaches, she should be put in good condition, not positively fat, and not thin, and if her digestion is disordered, it should be treated as directed elsewhere in this work. Medicines, especially those violent in their action, are only to be used by experienced men, and even then with extreme caution.

No person should be allowed to stay within sight of a mare showing signs



TAIL PRESENTATION.

of foaling. Even the attendant should keep in the background, as this animal has a natural aversion to anyone being present during delivery.

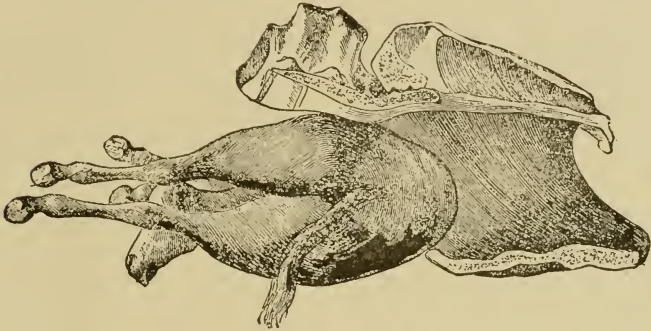
The stable should be warm, well ventilated, and free from drafts. A box stall is always advisable. A mare heavy with foal should never be tied in a stall, for if she should suddenly foal, she would be unable to clean the offspring, and, besides, during the labor, she might seriously injure herself.

If any marked weakness is shown after foaling, a dose of diluted whiskey is advisable. The after-birth is ordinarily passed within fifteen or twenty minutes, and while this is likely to be accompanied by additional pains of a colicky nature, they are not to be regarded as dangerous.

IV. Attention to the Foal.

Immediately the foal is born, the mother will clean it, and assist it to the teat. Occasionally it is passed still enwrapped in the membranes, and if these are not soon opened, it is liable to be asphyxiated. A careful inspection of the various openings of the body should be made to see that they are free; possibly the eyes, rectum, etc., may be imperforate, necessitating cutting the skin over them.

When the mother neglects to clean the foal, it may be rubbed dry with a soft cloth, or by some similar method. If too weak to stand, support and hold it up to the teat; in many instances bandages to aid in strengthening the legs are of much benefit. Constipation is a frequent trouble in very young animals, but may readily be removed by the judicious use of a little castor oil.



RIGHT TRANSVERSE POSITION.

V. Difficult Parturition in the Mare and Cow Compared.

In the mare there is not often much difficulty in parturition. In the vast majority of instances no aid is needed to bring the delivery to a successful termination, and parturition is accomplished in a very short time, the whole process being completed within about half an hour. Compared with the cow, the mare's difficult labors have been placed by different authorities at only 1-10 to 1-25 as many. But what she gains by the rarity of her difficulties she loses in the very serious nature that they take when they do occur. Practical farmers and breeders, for whom this book is expressly written, will be interested in a comparison which has been formulated by Donnarieix, as follows:

MARE.

1. Delivery is often followed by success.
2. A wound inflicted on the genital organs is generally fatal.
3. Inversion of the womb is nearly always irremedial.
4. Mares nearly always succumb to penetrating wounds of the abdomen during parturition.
5. Delivery of the most simple kind is occasionally followed by bad results. An abnormal and laborious parturitions not infrequently mare and foal succumb.
6. Difficult parturition proves a herculean task to the operator.
7. The duration of the life of the fetus in a case of abnormal labor does not extend beyond the fourth hour, on account of the young animal having to maintain its independent existence, as if already born.
8. The neck of the foal being very long, the head is usually found deeply buried in the flank whenever it is turned backward. The operator has very great difficulty in reaching the head with his hand; indeed, it is often impossible to bring it into its natural position. The loop slips off the neck of the lower jaw and has constantly to be replaced; it is scarcely possible to fix a cord there, this portion of the jaw being so short, and the fetus having no teeth.
9. When once the amniotic fluid has escaped, the introduction of the hand is difficult, owing to the genital organs becoming dry; this dryness causes an efflux of blood to the mucous membranes. The resistance made by the fetal membranes to manipulation, when made to ascertain either the position of the fetus, or for correcting the position, together with the struggles and violence of the mare, which now and then drops as if dead, are all difficulties to be overcome.

COW.

1. Delivery always terminates favorably.
2. A wound of these organs rarely causes death.
3. Inversion of the uterus is often curable.
4. This accident is generally not fatal in cows.
5. Delivery, even in the most complicated cases, generally proves comparatively easy, and obstetrical operations successful.
6. Such parturitions are not of much difficulty to a practitioner skilled in the necessary operations.
7. Under the same circumstances the calf may live four or five days in the womb, as life is maintained by the large number of placental attachments. These differences are explained by the mechanism of fetal life in the two species of animals, as well as by the anatomy of the uterus and fetal membranes.
8. The neck of the fetus being shorter and thicker, the head is less twisted, and the operator can with greater ease bring it back into its normal position; in addition there are teeth in the lower jaw, the neck of which is narrow, so that the slip-knot does not leave it, and straightening of the head and neck becomes an easy affair.
9. The genital organs are continually lubricated by a mucous fluid, which, while it facilitates the introduction of the hand, renders easy any necessary correction of position, and favors parturient operations. Besides, any movement made is not, in general, of much consequence.

VI. Difficulties Due to the Mother.

The cause of difficult labor is not often found in the mare, but when it is the obstruction is generally of a serious character. Among the number may be mentioned fractures of the hip bones, which, by uniting badly, have reduced the possible vaginal diameter; tumors on the bones; disease of the neck of the womb; twists of the womb; tumors in the womb, or the adjacent parts; structure of the vulva, etc.

VII. Difficulties Due to the Foal.

Ordinarily, the cause of difficult parturition is to be found in the foal. Malpresentations are, of course, the most common. Of these veterinary science has had to deal with an exceedingly large number, but principally with those forms in which the head is turned back or turned to one side, or the feet do not present properly. The head and tail presentations, both excellently illustrated by our artist, are the ordinary ones; the right or left transverse positions are necessarily sources of trouble. Under the head we are considering must likewise be mentioned excessive size of the foetus, its death, twins, too much fluid in the water-bag, monstrosities, deformities, etc.

VIII. Obstetric Instruments.

For the correction of a malpresentation, definite rules must be followed, and certain instruments are necessary.

When aid is given, always commence by securing the part that is presenting, with a rope; then insert the hand, to determine the cause of the



SHARP HOOK.

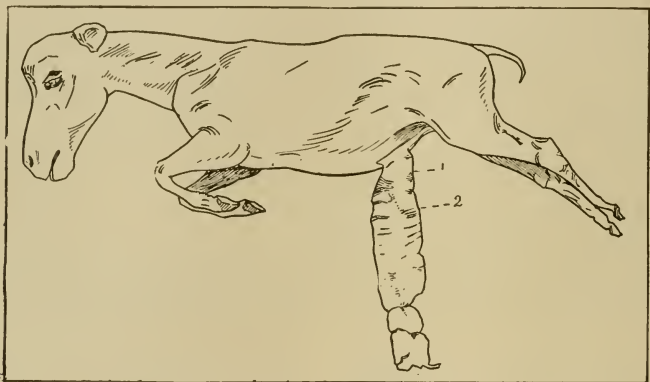


BLUNT HOOK.

difficulty. If due to the head or a foot being turned backward, bring it to a proper position before endeavoring to remove the foal. The instruments absolutely necessary are neither numerous nor costly, a thin, strong cotton rope, a sharp-pointed hook, a blunt-pointed hook, and a long iron rod with a cross-piece on the end, called a repeller. The last mentioned is exceedingly valuable for pushing away one part to allow of another being secured, or to aid in turning the foetus. The hooks are invaluable for taking firm hold of a part and helping to extract the foal; to the loop at the end a rope is attached.

IX. When the Foal Is Born Dead, or the After-birth Retained.

In those cases already referred to, where death and decomposition of the fœtus has occurred, or where the after-birth has been retained and becomes putrid, efficient antiseptic measures are necessary. After-treatment, such as is so prominent in the physician's practice, following difficult parturition, is never thought of in the veterinarian's. However, the copious use of lukewarm vaginal injections of a mild nature, are very requisite in the class of cases we are considering. An ordinary syringe will answer. From one to two quarts of the fluid should be injected into the vagina, whence it will gravitate to the lowest parts, and render harmless the germs accompanying the decomposition. This may be repeated twice a day, for three or four days, by which time its healthy action will have become very apparent.



UMBILIC CORD OF FOAL.

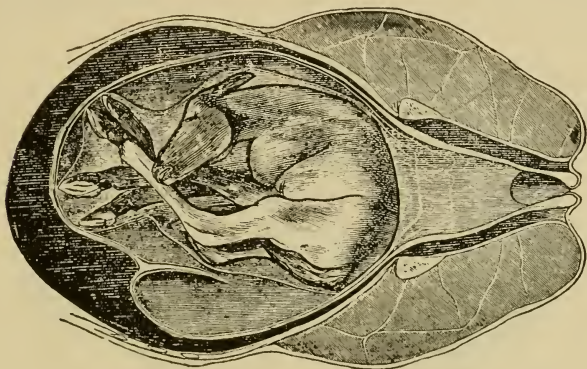
1. Cutaneous portion of cord.
2. Amniotic portion of cord.

X. The Umbilical Cord of Foal.

The umbilic cord must be divided and the last direct relation between the mother and young severed. This division results in a wound which involves the arteries, veins and urachus, each of which communicates with internal parts of the system of the young animal. Different writers assume different attitudes toward the care of the navel of the new-born. Naturally, the umbilic cord becomes ruptured in a variety of ways. In the foal the cord is so long (3 feet) that it is usually not ruptured when the fœtus is expelled, if the mare is recumbent, but gives way only when she rises to her feet, and even then in some cases not until she turns her head toward the fœtus in order to care for it, and in so doing pulls the cord in

two near the umbilicus. In other cases, in the mare, the chorion becomes detached from the uterus almost immediately after the expulsion of the fœtus and comes away with the cord still intact. It is then ruptured later by the struggles of the fœtus itself. The mare may step upon some portion of the membranes when the foal is attempting to get up, and the foal, in falling, throws its weight upon the cord in such a way as to rupture it.

After it ruptures, the behavior of the parts when left undisturbed is interesting and highly suggestive of the degree and character of interference demanded upon the part of the attendant. One of the most prominent effects of the rupture of the cord by linear tension, or by laceration by the teeth of the mother, is the promptness with which hemostasis is brought about, so that as a rule there is but little hemorrhage, appearing



DORSAL (OR BACK) PRESENTATION.

usually to not exceed the amount of blood lying in the umbilic veins outside the umbilic ring.

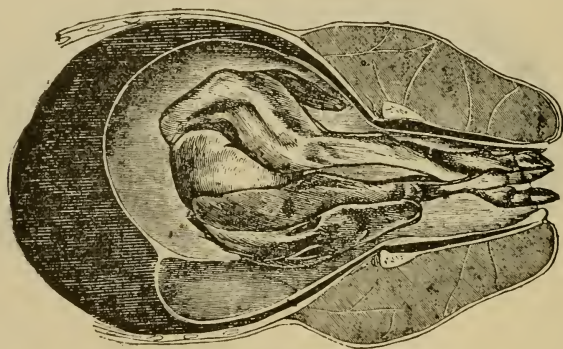
XI. Various Presentations Illustrated.

The *presentation* results from the part of the fœtus which first offers itself at the pelvic inlet—that region of the young creature which the hand of the obstetrice immediately meets on being passed into the os, and which is directly opposite the inlet. In this sense the head, fore feet, hind feet, croup, etc., are said to be presented, according as one or other of them first offers itself on exploration.

These presentations are extremely variable, as any part of the fœtus may occupy this situation; though so far as description and comprehen-

sibility are concerned, their study can be greatly simplified. As Rainard says: "The fœtus, when covered by its envelopes, is oval shaped, or like an olive, which it is desired to pass down the neck of a bottle, and which may be presented to this in three ways—either by one of its two ends or by its middle." These ends are the anterior part of the chest in front, and the croup behind; and it is these parts on which the classification of these presentations is based. This classification gives two longitudinal and an anterior and posterior presentation; and, as the fœtus may also offer itself across the long axis of the uterine cavity, we have a *transverse presentation*, which may again be *dorso-lumbar* or *sterno-abdominal*, according to the side of the fœtus which presents. These four fundamental presentations are, therefore:

1. *Anterior Presentation*.—The chest of the fœtus presents towards the inlet, and is preceded, accompanied or followed by the head and fore



VENTRAL (OR BELLY) PRESENTATION.

limbs; the situation and direction of which may vary without altering the essential features of the presentation.

2. *Posterior Presentation*.—The croup or breech is facing the inlet, and the presence or absence of the limbs there only constitute varieties of the presentation.

3. *Dorso-lumbar Presentation*.—Any portion of the *upper* part of the body opposite the inlet. Leeock and Rainard admit presentations of the withers, back, loins, shoulder or haunch, as distinct presentations; but I agree with Saint-Cyr in declaring the distinction to be practically useless. On exploring the pelvic cavity, no matter what part of the back is first touched, the hand always encounters the spine of the fœtus, either directly in the axis of the pelvis, or obliquely and at some distance from it. All

these varieties may, therefore, be reduced to the one now named, and which may be either direct or oblique, according as the case may be.

Sterno-abdominal Presentation.—The limbs in this are in reality first touched, and we may have all four, or only three or two; these, however, are not the fixed point of the presentation, which is the inferior part of the body—or sterno-abdominal region—hence the designation.

These four principal presentations may be divided into *natural* or *normal*, in which spontaneous or unaided birth is possible; and into *unnatural* or *abnormal*, in which parturition is impossible without the intervention of man. The longitudinal presentations alone comprise the first, although they are not always *normal*; as a wrong direction of the head or limbs may prove an obstacle more or less difficult to overcome, and may require the aid of art. So that, taking this view into consideration, the presentations may either be *simple* or more or less *complicated*, according to circumstances.

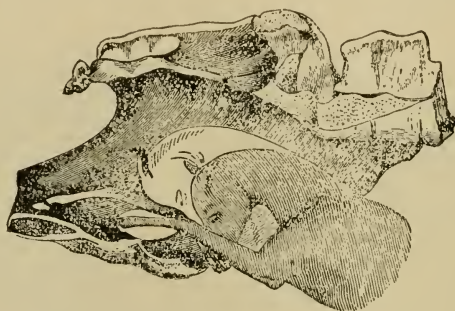
XII. Positions of Foal.

The presentation being determined by the part of the fœtus which offers at the pelvic inlet, it must be evident that this part, whichever it may be, may vary considerably in its relations to the circumference of that passage. If the chest of the fœtus first enters it, the *attitude* of this region may be very different in different cases; in one the withers may correspond to the sacrum of the mother, and the sternum to the pubis, or the reverse may happen; in another the fœtus may be lying on the right side, the sternum corresponding to the right branch of the mother's ilium, and the withers to the left ilium, or *vice versa*. So that here are four different positions in the same presentation—the *anterior*; and it will readily be understood that it should be the same, or nearly the same, for the other presentations.

The *position* has accordingly been defined to be the relation of a determinate point on the surface of the fœtus, to an equally determinate point of the pelvic circumference. The points, so far as the mother is concerned, may be determined once for all, and they will always remain the same for every presentation; they may be, for instance, the sacral region above, the pubic below, and the two ascending branches of the ilium at the sides. If, with the fœtus, we select any region—say the withers—and put this part in relation with any of these four points of the pelvic circumference, we shall have four successive and easily recognized positions. If, therefore, we first give the name of the region in the fœtus, and next that of the pelvic circumference with which it is in relation, we have a ready means of designating the positions: describing the fœtus to be in *vertebro-sacral position*—for instance, when its *vertebral region* is in relation with the *sacrum* of the mother. The fixed points may be invariable in the latter; but they cannot be so with the fœtus, as they will vary with each presentation.

With regard to the anterior and posterior presentations, Rainard has selected the fixed points as follows: for the first he has taken the spinous processes of the dorsal vertebræ in the region of the withers; for the second, the lumbar vertebræ. For the positions in the other two presentations he has not been so fortunate in a designation, in the opinion of Saint-Cyr, who has very judiciously proposed others which are more explicit and comprehensible. The latter gives the various positions which should be recognized in each presentation, as follows:

ANTERIOR POSITION.—The chest of the fœtus is at the pelvic inlet, and it is desired to make known what relation this part has to the pelvic circumference. The determinate point on the fœtus is the vertebræ of the withers; and these may be in relation with the sacrum above, the pubis below, the right ascending branch of the ilium on the right side, and the



ANTERIOR PRESENTATION: DOWNWARD DEVIATION OF THE HEAD.

left *ditto* on the left. From this we have four positions, named by Saint-Cyr, as follows:

1. *Vertebro-sacral Position.*—This is the most favorable and the most frequent of all, and is said to be the only natural position. The vertebræ of the fœtus correspond to those of the mother, its withers touching the sacrum of the latter, the belly corresponding to the abdominal parietes, and its sternum to the pubis. This is sometimes named the *first anterior position*.

2. *Vertebro-pubic Position.*—This is exactly the inverse of the first: the fœtus lying on its back, its withers towards the pubis, and the sternum opposed to the sacrum of the female. This is also named *second anterior position*.

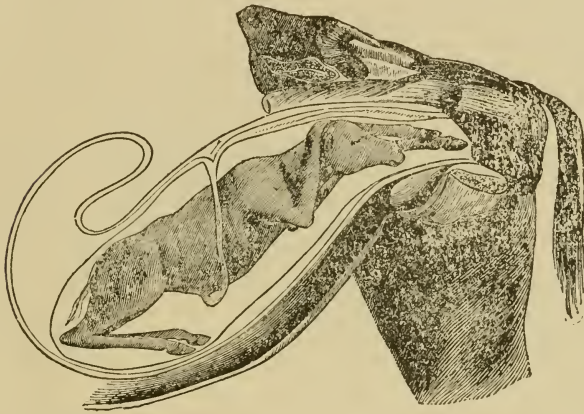
3. *Left Vertebro-ilial Position.*—The fœtus lies in the right flank, its head to the left side of the mother, the neck being in the same direction,

and, when passing through the pelvic cavity, touching the ascending branch of the left ilium. The feet, when they are not in the pelvis, must, of course, be sought for on the opposite side, towards the right flank of the mother.

4. *Right Vertebro-iliac Position*.—This is exactly the reverse of the last-described position, the withers corresponding to the right ilium.

The last two are sometimes named the lateral positions. They are less frequent, as primary positions, than the first two, and are sometimes met with as secondary positions after the reduction of a malpresentation—chiefly the dorsal or ventral.

POSTERIOR PRESENTATION.—In this the croup or breech first presents at the pelvic inlet. The lumbar region of the fœtus, which is the deter-



ANTERIOR PRESENTATION; FORE LIMB CROSSED OVER THE NECK.

minate point, may be directed towards the sacrum, the pubis, or the right or left branch of the ilium of the female. Hence we have four positions, as in the preceding presentation. These are:

1. *Lumbo-sacral Position*.—The fœtus is in what some authorities have called a “natural” position, but which is asserted by others to be unnatural. The loins are towards the sacrum of the mother, the right coxo-femoral articulation towards the right ilium, and the left articulation towards the left ilium. This is sometimes named the *first posterior position*.

2. *Lumbo-pubic Position*.—Some practitioners designate this the posterior reversed position. The fœtus, in fact, is lying on its back, its croup

and loins corresponding to the pubis of the mother, while the limbs are towards the sacrum, against which they are more or less pressed. This is sometimes termed the *second posterior position*.

3. *Left Lumbo-ilial Position*.—The fœtus is lying on its left flank, its croup and loins opposite the ascending branch of the left ilium of the female, and the limbs towards the right flank, where they must be sought for if they do not present in the pelvis.

4. *Right Lumbo-ilial Position*.—This is exactly the reverse of the preceding position.

XIII. Dorso-Lumbar Presentation.

Here the fœtus is presented across or *transverse*, and it may lie on one or other of its sides, its head towards one of the maternal flanks, and the body curved like that of a dog asleep. In this we have two distinct positions, according as the fœtus lies on one side or the other. But it may also assume a third and almost vertical position—the croup on the floor of the abdomen of the mother, and the creature in the attitude of a dog sitting.

The important consideration in these three positions is related to the situation or direction of the head; as, if this is known, we may easily infer that of the other parts of its body, and thus appreciate the indications for delivery to be followed in this pathological presentation. According to the direction of the head, the three following positions are described:

1. *Right Cephalo-ilial Position*.—The fœtus is on its right side, which rests more or less directly on the abdominal walls of the mother, the head in the right flank, the croup towards the left flank, the body more or less curved, and the dorso-lumbar region towards the pelvis, in which it presents.

2. *Left Cephalo-ilial Position*.—This is the reverse of the preceding.

3. *Cephola-sacral Position*.—In this position the fœtus is presented by the back, and in an almost vertical attitude: the croup resting on the floor of the mother's abdomen, the head more or less depressed, and directed forward towards the sacro-lumbar region—the creature being seated, as it were, on the udder of its parent.

XIV. Sterno-Abdominal Presentation.

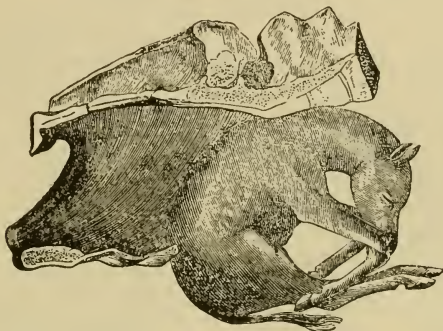
In this presentation the fœtus offers the abdomen to the inlet of the pelvis, and on exploration the hand first meets this part, and two or more of the limbs, but always at least a hind and fore one. The head may be found, or it may be out of reach. The sternum and other parts on the lower surface of the body can also be felt.

In this presentation there are two principal positions:

1. *Left Cephalo-ilial Position*.—The fœtus lies on the right side, the head towards the left ilium of the mother, and the croup to the right ilium.

2. *Right Cephalo-ilial Position*.—This is the reverse of the preceding.

Saint-Cyr, who has mainly followed Rainard in the definition of these presentations and positions of the fœtus, insists on the necessity for studying them carefully, as by so doing those who commence the practice of obstetricaly will be greatly enlightened as to the difficulties they may encounter, and the readiest and most scientific way of overcoming them; while this study will enable the skilled practitioner to describe his interesting cases with more clearness and precision. To render what has just been



CEPHALO-SACRAL POSITION OF THE FOETUS.

stated more convenient, the following table is given, in order to show at a glance the different presentations and positions.

PRESENTATIONS AND POSITIONS OF THE FOETUS.

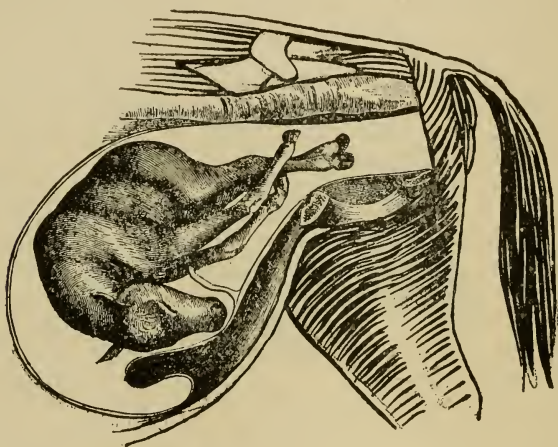
Anterior Positions	{	1. Vertebro-sacral.
		2. Vertebro-pubic.
		3. Right Vertebro-ilial.
		4. Left Vertebro-ilial.
Posterior Positions	{	5. Lumbo-sacral.
		6. Lumbo-pubic.
		7. Right Lumbo-ilial.
		8. Left Lumbo-ilial.
Dorso-lumbar Positions	{	9. Right Cephalo-ilial.
		10. Left Cephalo-ilial.
		11. Cephalo-sacral.
Sterno-abdominal Positions	{	12. Right Cephalo-ilial.
		13. Left Cephalo-ilial.

XV. Mechanism of Parturition.

Under normal conditions, it may be said that the pelvis itself does not offer any obstacle to the passage of the fœtus, and that it is the soft parts alone which oppose its exit.

Of the different presentations we have enumerated the anterior—in which the fore feet, head and chest present simultaneously—is the only one we may designate as “natural,” especially with the larger animals and primiparæ.

Fromage de Feugré was the first to point this out, though Rainard was of opinion that the posterior presentation should also be looked upon as normal; while Desplas gave three natural positions—head and fore limbs,



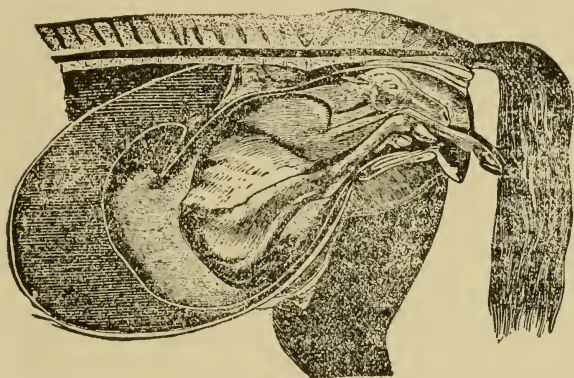
STERNO-ABDOMINAL POSITION OF THE FŒTUS.

head only, and hind limbs only; and Delwart gives four normal positions. But experience abundantly proves that the first we have described is that which alone merits the designation, as it is the one in which birth can take place without artificial aid. It is true that birth is possible when the foal or the calf presents posteriorly at the pelvic inlet; but this is a rare presentation, and under the most auspicious circumstances it is much less favorable and more difficult for the mother, while it is very often death to the young animal (especially in the mare). In the majority of cases, without assistance expulsion proceeds no further than the hocks, and the fœtus dies; and even sometimes with assistance much force is necessary to deliver. Whereas, in the anterior presentation, the cases are exceptional (and these chiefly in primiparæ) in which even slight traction is necessary.

We will follow Saint-Cyr in first studying the mechanism of parturition in this presentation, in which, of the four positions pertaining to it, the *vertebro-sacral* is by far the most frequent and favorable. This we will now notice.

XVI. Mechanism of Parturition in the Anterior Vertebro-Sacral Position.

In this position it has been stated that the fœtus presents simultaneously with the head and fore limbs, the back directed to that of the mother and the withers towards the sacrum. When perfectly natural, the head and fore legs first enter the inlet; the head is extended, forehead looking upwards to the sacrum, chin towards the pubis, nose forward, the lower jaw resting on the outstretched limbs, the feet of which extend a little beyond the nose. Then comes the neck, and after it the chest and shoulders, which arrive at the inlet when the nose and feet show themselves at the vulva.



HIND-LIMB DEVIATION; ANTERIOR PRESENTATION.

In this course it will be observed that, so far as the head and limbs are concerned, there is no difficulty, as the pelvic diameter readily admits them when the soft parts are sufficiently relaxed. With the chest, however, there is difficulty, as its diameter is greater than that of the pelvis; and the question is, therefore, how it is got through the canal. Saint-Cyr saw four well-bred harness and saddle mares give birth to foals at the Lyons Veterinary School. Gestation had been regular, and parturition, which was easy and favorable, did not exceed the ordinary duration. In taking the diameters of the maternal pelvis by the method already described, and those of the fœtus (dorso-sternal, bicipulo-humeral, and bicoxo-femoral), it was found that in these four instances the bicipulo-humeral diameter—

the largest in the chest—was easily accommodated in the bis-iliac diameter of the female pelvis, which was greater by 42, 45, 48 and even 52 millimetres (from $1\frac{1}{2}$ to 2 inches); while the sterno-dorsal diameter of the young creatures exceeded that of the sacro-pubic region in the mothers by 28, 85, 87, 88 millimetres (from 1 to $3\frac{1}{2}$ inches). This part of the body of the fœtus had, therefore, to undergo a corresponding reduction in a vertical direction before it could clear the inlet; and even if we take into account the excess of the lateral diameter of the pelvis, it will be found that the thorax and withers of the fœtus still notably exceed in size the opening through which they must pass. That they do pass through it, and with ease in the majority of cases, without injury to the mother, or the young creature, is a matter of daily experience; but the mechanism by which the reduction is effected has been much discussed.

Lafosse endeavored, in the last century, to describe it, and came to the conclusion that the head once through the inlet, the shoulders of the foal, which exceed the withers, pass by their upper part in front of the neck, thus forming a kind of channel which glides along the maternal sacrum; also that the spinous processes of the withers, which are almost cartilaginous, bend back on each other, and to right and left of the spine, thus preventing too great compression of the chest. Altogether, he concluded that the foal, in its passage, becomes moulded in such a manner that the chest has the form of the keel of a ship gliding on the stocks, and in every way corresponds to the mother's pelvis, whose internal contour it assumes.

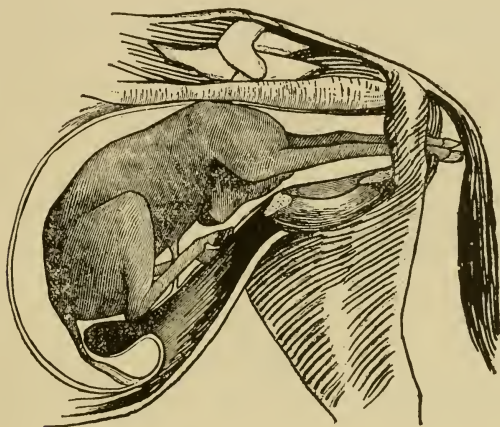
Rainard, however, takes a slightly different view of this matter; for, while admitting, with Lafosse, the inclination backward of the dorsal spines as a first cause in diminishing the vertebro-sternal or perpendicular diameter of the thorax, he cannot admit that the upper border of the scapulæ lie against the neck, but states that the shoulders, on arriving at the pelvic entrance, come in contact with the ascending branches of the ilium, and are thrown back somewhat, leaving the front part of the chest free, and thus diminishing its diameter. He also adds that the withers first enter beneath the sacrum; that the sternum below is pushed back by the anterior border of the pubis, and the chest in this way submits to a process of elongation which notably diminishes its vertical diameter.

Saint-Cyr agrees with Rainard in this interpretation of the real mechanism of parturition in the mare. The sternum in being carried backwards also pulls back the ribs attached to it, and this not only diminishes the chest in a vertical, but also in a horizontal direction, as is witnessed in studying the mechanism of respiration in the living animal, in which, during expiration, the chest decreases in width and depth. When the chest is so altered during parturition, the fœtus becomes, as it were, elongated by this part being depressed: an alteration which occurs all the more readily from the bones composing the thorax being soft and supple, and the organs they enclose (the lungs) not being so developed as they

are immediately afterwards; so that a moderate amount of pressure, provided it is not too long continued, may be borne with comparative impunity.

In the larger animals the pelvis cannot undergo any sensible increase in size during the passage of the deepest portion of the foetal body through the inlet, which is, in the mare, an absolutely inextensible bony girdle. Lafosse has sawn through the pubis of mares about to foal, and he found that during parturition there was only a space of two lines between the sawn margins. So that it is the body of the foetus which has to accommodate itself to this part of the passage at this stage of delivery.

When, however, it has passed through the inlet, extensibility of the maternal tissues can, and does, take place, and permits an enlargement of the canal. The wide sacro-ischiatic ligaments, which enclose the pelvis



ANTERIOR PRESENTATION; EXTREME DOWNWARD DEVIATION OF THE HEAD.

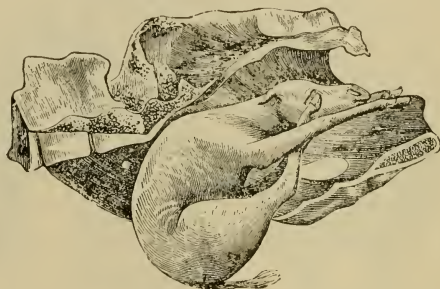
laterally, are softened and more elastic during birth; the sacro-iliac and sacro-lumbar articulations are increased in mobility; and even the posterior part of the ischio-pubic symphysis may become slightly relaxed. So that when once approaching the outlet the progress of birth is more rapid, and this progress may be aided if, as is pointed out by Lafosse, the tail of the animal is well elevated.

A slight check to expulsion is observed (especially in the mare) when the croup arrives at the inlet, as this part nearly corresponds in diameter to this opening, being, if anything, slightly less. However, notwithstanding this, in consequence of the croup being less susceptible of diminution than the chest, and although the bones may yield to some extent, friction

will occur, more particularly if the croup is largely developed, which it is in some foals. One haunch may pass into the inlet before the other, however, and thus facilitate the passage.

With the cow the mechanism of parturition in this presentation is similar to that in the mare. Saint-Cyr shows, from actual measurements of cow and fœtus, that the head of the calf can easily pass into the inlet, owing to its less diameter; and that the principal difficulty is encountered by the fœtal thorax, which is slightly larger in every sense than the inlet.

The bicoxo-femoral diameter of the croup slightly exceeds the bis-iliac diameter of the pelvis; but it is possible that the pelvis of the calf, being more cartilaginous and supple than that of the foal, may be submitted to a slight temporary compression. It is to be remarked, however, that the progress of the calf through the pelvis must be more protracted than that of the foal, owing to the greater length of the maternal pubic symphysis, and the more considerable extent of the pelvic walls, as well as the peculiar



FORWARD DEVIATION OF POSTERIOR LIMBS IN ANTERIOR PRESENTATION.

curve in the floor of the pelvis; though these disadvantages are somewhat compensated for by the greater mobility of the sacrum. And, as we have seen, such is really the case, the duration of parturition being shorter in the mare than in the cow.

With regard to the other animals, the same remarks will apply. We may just note that with the common-bred bitch, which has a more or less elongated muzzle, when fecundated by a dog of the same conformation and size, and which in due course brings forth from five to eight young, there is usually no difficulty in delivery. The conical form of the muzzle of the puppies, and the softness of their tissues, permits their entering the inlet in this presentation and passing easily through it under the influence of the uterine and abdominal contractions. But when the bitch is of small size, and is fecundated by a young, vigorous and larger dog, and especially if the muzzle of either or both parents is short, then the

head of the puppies is usually large and round, with the forehead high, and the presentation offers grave, and frequently insurmountable difficulties. This is more especially the case if the puppies are few in number, when they are usually larger.

XVII. Mechanism of Parturition in the Anterior Vertebro-Pubic Position.

In this position the same diameters of the fœtus correspond to those of the maternal pelvis; though in practice it is found that this position is less favorable, and that delivery is always more difficult and longer than in the first anterior position. This appears to be due to the fact that in the latter the dorsal spines, or withers, the most prominent part of the fœtus, glide along the vertebral column of the mother in the kind of channel formed by the psoas muscles, and is naturally directed towards the pelvis; while in the vertebro-pubic position it comes against the brim of the pubis, where greater, more frequent and more continued contractions are needed to raise it to this kind of step leading to the inlet. And when it has cleared this obstacle, the fœtus still passes with difficulty through the canal, as the curve of this passage is exactly the reverse of that offered by the body of the fœtus; all the articulations of the vertebræ, but particularly that of the atlas with the occiput, and those of all the limbs, being flexed downwards, or in a contrary direction to the curve of the sacrum. Consequently, in order to accommodate themselves to this curvature, all these articulations must be forcibly extended—an unfavorable condition—while the pressure and friction must be considerable. And not only is progress through the pelvic canal slower and more difficult, but the maternal organs are also exposed to injury, and sometimes receive serious damage: the feet of the fœtus having a natural tendency to be carried upwards, may squeeze the vagina against the sacrum, or press against the perineum, etc., when we may have lacerations of the vagina, vulva, perineum, or other part.

XVIII. Mechanism of Parturition in the Anterior Vertebro-Iliac Positions.

These lateral positions—two in number and symmetrical—are rarely primary, but are sometimes found as *secondary positions*, due to the reduction of some malpresentations. Spontaneous birth is impossible in these positions, because the chest of the fœtus presents its greatest diameter to the smallest diameter of the pelvis of the mother. This, however, is an exaggeration, as Saint-Cyr points out that the bis-iliac diameter is sometimes equal, or even superior, to the sacro-pubic diameter; so that it is not always absolutely impossible for delivery to occur spontaneously in these positions; though it is very true that it is *always* more difficult, and *sometimes* impossible, if the position is not altered. Independently of the disproportion between the diameters of the pelvis and the corresponding diameters of the

fœtus, here also we find the two salient parts of the latter—the sternum and dorsal spines—jamming against the two resisting parts of the pelvic circumference—the ascending branch of each ilium—and it will be readily seen that in some cases these will prove an insurmountable obstacle. Nevertheless, as a general rule, this obstacle may be easily turned by merely causing the body of the fœtus to rotate on its axis in such a manner that its greatest diameter will be brought opposite the oblique diameter of the inlet, which extends from the ileo-pectineal ridge to the sacro-iliac articulation on the opposite side. Then its entrance into the pelvic cavity, and complete expulsion, is rendered possible.

XIX. Mechanism of Parturition in the Posterior Lumbo-Sacral Position.

Of the four positions in which we may have a breech or posterior presentation, only one is compatible with spontaneous delivery—the *lumbo-sacral*. The fœtus is presented by the breech, the loins towards the sacrum of the mother, the hind limbs in complete extension and entering the inlet, so as to open the passage for the body; and though this position may appear to be favorable for the expulsion of the young creature, yet it is far less so than the first anterior position. The croup of the fœtus is a rounded voluminous mass which does not admit of much compression, and the diameters of which—particularly the transverse—are nearly equal to those of the pelvis; it is, therefore, not well disposed for passing through the latter, and, in addition, its upper part presses against the sacro-vertebral angle; while the stifles, which are salient, press against the edge of the pubis, and the hip joints against the branches of the ilium. Entrance into the inlet must therefore be slow, difficult and painful for the mother, and when this first obstacle is overcome and the croup is in the pelvic cavity, the chest has to follow, and to submit to the same compression at the inlet as in the anterior presentation. But this part of the fœtus is much less favorably disposed for such a reduction of dimensions in this position, as the resistance offered by the walls of the maternal pelvis has a tendency to erect the dorsal spines and to carry the ribs and sternum forward—all this going to increase the diameter of the fœtus in every direction. It is only, then, by direct compression or crushing, that the necessary diminution in the diameters of the young creature can be effected, and not by a kind of physiological decrease, as in the anterior presentation.

There is also the obstacle offered by the hair of the fœtus, the “set” of which is against the direction of movement; and this obstacle will be greatly increased if the fluids have escaped for some time, and the parts are more or less dry.

Taking all these considerations into account, it will be seen that in this position, even when birth is possible with extraneous assistance, labor must be long and exhausting, and that the young creature incurs the greatest danger. Labor, however, is more likely to be successful and less tedious if

the haunches of the fœtus present one after the other at the inlet; so that a slight obliquity in the presentation makes a great difference; and it is just possible that when birth takes place in this position without aid, this obliquity may have been present.

In the cow, the calf is more frequently born alive in this position than the foal, and birth is easier; a circumstance which is, in all probability, due to the smaller dimensions of the croup in the young of the bovine species.

XX. Necessary Aid in Normal Parturition.

Although, as a rule, parturition is generally effected in animals in what we have designated a "spontaneous" manner (without the intervention of man), and without danger or prejudice to the mother or offspring; and although these do not require that minute and scrupulous attention bestowed on woman, even when birth has been easy, yet from the nature of this act and the unfavorable consequences which are sometimes noted, certain precautions should be observed by the owner of the animals at this period, and especially if these should happen to be valuable and very artificially kept. These attentions and precautions should be entrusted for their carrying out to competent persons selected by the owner, as it is seldom that the veterinarian is called in unless something serious has occurred. The mother, as well as the offspring, require watching and more or less nursing.

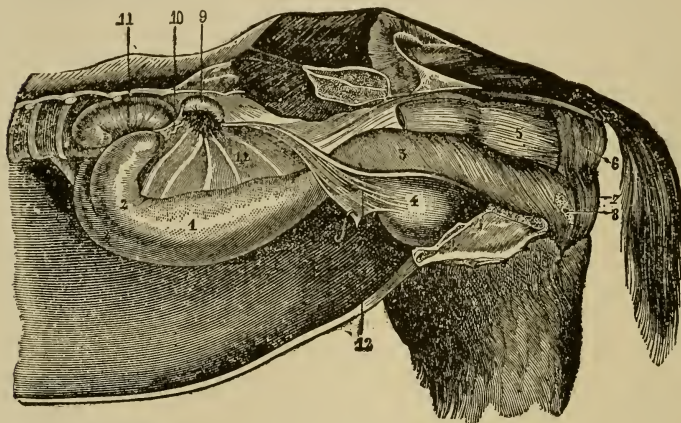
XXI. Spaying, or the Castration of the Mare.

Spaying consists in removing the essential organs of generation—the ovaries. It is the counterpart of castration in the stallion. When the mare is spayed, the object, generally, is to cure nymphomania, or some other disease peculiar to her sex. The effect of this operation upon a ferocious animal is often very marked; she soon becomes docile and easily managed. In case of the cow, if the operation is performed after the third or fourth calf (the best time), both the quantity and quality of the milk is improved, and the flow will continue thus from eighteen to twenty-four months. Besides this, she will then readily lay on a great deal of fat; as beef, her flesh is tender and juicy, and she will bring considerably more money when sold to the butcher. Of course, she can never produce any more calves.

There are two methods of operating in spaying—(1) through the flank, and (2) through the vagina. The former method requires only a knife and an *ecraseur*, or a knife and a silk thread for a ligature, and is the easier one, particularly so for the inexperienced operator. The animal is most easily worked on when she is in the standing position, with the feet hobbled, the head held by a twitch, and the body pressed against the wall.

The left is the flank usually chosen. A vertical incision in the upper part of this region is made, sufficiently long to admit the hand, which is passed in and upwards; the horn of the uterus will be felt just below the rectum, as shown in the engraving, and, at the extremity of the horn, the egg-shaped ovary. The ovary is drawn out of the opening and removed with the esraseur, or by using a silk ligature and cutting it off with the seissors. Thus the left ovary is extirpated. The right is next to be felt for at the other horn of the uterus, and drawn out and removed in the same way.

Spaying through the vagina requires special instruments; the principal are a concealed knife, the torsion forceps or the ecraseur, or ligature. It being too difficult an operation for anyone not an expert, our descrip-



THE POSITION OF THE ORGANS OF THE MARE.

- | | |
|-------------------|-----------------------|
| 1—Uterus. | 6—Anus. |
| 2—Horn of Uterus. | 7, 8—Vulva. |
| 3—Vagina. | 9—Ovary. |
| 4—Bladder. | 10—Oviduct to Uterus. |
| 5—Rectum. | 11—Kidney. |
| | 12—Abdominal Muscle. |

tion of it will purposely be condensed. The place where the opening is made is the vagina, at a point just behind the neck of the womb, at the top of the cavity. The opening needs to be about two and one-half inches long, and parallel with the cavity. Through it the finger is passed, and the ovary, when secured, is drawn into the opening and twisted off with the forceps, or crushed off with the ecraseur, or cut off with the knife and the vessels ligatured. This process is then repeated on the opposite side. There are other instruments for dilating the vagina, and for guiding to the place to cut, that we have not described; they are very costly, and of no use to the average horse owner.

CHAPTER XIX.

DISEASES OF THE ORGANS OF GENERATION.

OF THE MALE:—I. INFLAMMATION OF THE TESTICLES.—II. HYDROCELE, OR DROPSY OF THE SCROTUM.—III. EVIL RESULTS OF CASTRATION.—IV. WOUNDS OF THE PENIS.—V. GONORRHEA.—VI. PHIMOSIS AND PARAPHIMOSIS.—VII. MASTURBATION.
OF THE FEMALE:—VIII. PARTURITION.—IX. METRITIS, OR INFLAMMATION OF THE WOMB.—X. INFLAMMATION OF THE OVARIES.—XI. LEUCORRHEA.—XII. PUERPERAL FEVER.—XIII. MAMMITIS.—XIV. HYSTERIA.—XV. ABORTION.

Horses as a race do not suffer with these diseases as much as cattle and other lower animals, probably on account of their greater activity, which is conducive to health, that of the organs of generation as well as of other parts of the body.

I. Inflammation of the Testicles.

This usually occurs as a result of external injury, but is sometimes the result of excessive copulation, glanderous deposit, or a localization of other morbid conditions of the system. There will be more or less tumefaction, great soreness, some fever and a straddling gait.

What to do.—Give a purgative, No. 23; also, give No. 16 in the feed, which should be light and soft, grass if possible. Spread over the organ a little solid extract of belladonna once a day, after hot fomentations. Give gentle exercise, but allow rest from active male service for a week, or longer if necessary. Should it go on to suppuration, open it and inject lotion No. 39. If it becomes calloused, hard, and does not diminish in size, substitute lotion as follows:

No. 74.	1 Drachm iodine,
	1 Drachm potassium iodide,
	$\frac{1}{2}$ Pint water.
	Mix.

Inject a tablespoonful into the organ twice a day, and apply some on the outside. If treatment fails, castration must be resorted to. (See chapter on operations.)

II. Hydrocele, or Dropsy of the Scrotum.

The scrotum is the pouch or bag that contains the testicles. Dropsy of it is due to the effusion following an injury thereto. It will be found enlarged, tender, soft and fluctuating.

What to do.—Draw off the water with a small trochar and cannula ; repeat it, if necessary, half a dozen times, for these cavities are prone to refill. Paint the outside with tincture of iodine. If all means fail and the case becomes hopeless, resort to castration. (See chapter on operations.)

III. Evil Results of Castration.

Scirrhus cord.—When the cord is left too long, the ends hanging down between the lips of the wound made in the scrotum, it becomes adherent to them, and the whole swells together, becoming an indurated mass, sometimes as large as a child's head.

What to do.—The horse must be cast, the cord dissected away from the scrotum, and the cord (which will be found in the form of a tumor) excised. In the absence of a good veterinarian, excise it with the ecraseur, taking pains to get down low, so as to take out as much of it as possible, and dress it, twice a day, with lotion No. 5.

Abscess in the scrotum.—This occurs from healing of the wound before the suppurative process, which always follows to a greater or less extent, is finished. The confined pus accumulates and forms a large abscess, causing the sheath to swell, as also the lymphatic glands on the inside of the thigh, giving rise to a straddling gait and disinclination to move.

What to do.—Open it freely, and evacuate the pus, when it will commonly heal readily ; if it does not, however, inject lotion No. 5, twice a day.

Projecting cord.—Sometimes a small teat-like piece of the cord will project through the wound in the scrotum, preventing it from entirely healing. Pinch this off close to the scrotum with the thumb nail, and cauterize it with lunar caustic.

Tumors on the cord.—These may form from catching cold after castration, strangulation of the cord, or too rough handling. They sometimes attain the size of a child's head. The tumor differs from scirrhus in being situated higher up in the canal. It must be dissected out, the same as scirrhus cord above described.

IV. Wound of the Penis.

This sometimes happens to stallions while teasing mares ; it gets kicked, swung against a fence, or struck by mischievous boys in play. Sometimes amputation is necessary. (See chapter on operations.) When an operation is not necessary, foment with hot water and apply lotion No. 24, two or three times a day. If tumefaction is great, support the penis with a bandage passed over the loins.

V. **Gonorrhoea or Gleet.**

This is catarrh of the mucous membrane lining the urethra. Its causes are excessive work in the stud, connection too soon after parturition, or irritating substances in the urine.

How to know it.—The urine will be passed in small jets, with frequent interruptions and manifestations of pain, and there will be some swelling and soreness of the parts.

What to do.—Suspend the labor in the stud for a couple of weeks; foment with hot water frequently, and inject the following lotion twice a day: (See also page 448,—treatment for another type of this disease.)

No. 75.	2 Drachms sulphate of zinc,
	1 Pint water,
	Mix.

Or, instead, the following may be used:

No. 76.	3 Drachms sugar of lead,
	1 Pint water,
	Mix.

VI. **Phimosis and Paraphimosis.**

These are swollen conditions of the penis. In the former, the penis is swollen and confined within the sheath, so that it cannot be protruded; in the latter, the penis is swollen outside the sheath, and cannot be withdrawn.

What to do.—When phimosis exists, open the external portion of the sheath, so as to enlarge the opening; then, if the penis is swollen when liberated, bathe with cold water, and apply lotion No. 24 three times a day.

For paraphimosis, bathe with cold water, apply lotion No. 24 three times a day, manipulate as much as the soreness will allow, and support the penis with a bandage passed across the loins. Do not, on any account, omit the bandage, as the weight of the swollen organ is alone sufficient to keep it irritated and inflamed. If this fails to accomplish the desired effect, the rim of the sheath may be slit up a little ways, and the organ manipulated and pushed back. Leave the cutting, however, for the last resort.

VII. **Masturbation.**

This is a bad habit of abusing nature, that some stallions get into. It may result from weakness, consequent upon overwork in the stud, or, on the other hand, from superfluous passion attending want of work in connection with high feeding. When from the former cause, reduce the work, give walking exercise, and administer tonics, such as Nos. 67, 35 or 33. When from the latter, give, for a purgative, No. 23, reduce the feed, increase the exercise, and give No. 37. It debilitates the horse so much that it makes him useless. In addition to the remedies mentioned, let him wear a shield whenever standing in the stable. This will usually cure a case that requires an erection to emit the semen, but oftentimes, in bad cases, emission will take

place without erection; it flowing away, occasionally, with the urine. In such a case castration is the only remedy. To prevent this disastrous habit, let all stallions wear shields from the time they are two years old.

DISEASES PECULIAR TO THE MARE.

Diseases of the generative organs are not so numerous in the mare as in the cow, probably owing, as before explained, to her leading a more active life.

VIII. Parturition.

This the mare gets through with very quickly when everything is right, but when it goes wrong or is prolonged, on account of malpresentation, or malformation of the pelvis, the case is very bad indeed. The cow may be in the act of calving many hours, and come out all right, if she gets the right kind of assistance, but the mare, if not relieved, may die inside of an hour. Do not interfere, however, unless absolutely necessary in consequence of delivery coming too soon, (as from some external violence), and before the ligaments of the pelvis are relaxed to allow the fœtus to pass, or of some malpresentation. In such cases, assistance, to be of any service, must be rendered soon and efficiently.

The mare should be strong and in good healthy condition; as to flesh, not too fat nor too thin, and strong, as a result of proper exercise. The bowels should be loosened by giving soft feed, roots, etc., at the close of the period of gestation. In the great majority of cases, little or nothing else is necessary.

What to do.—In case of malpresentation, refer to the corresponding position in the cow, which will be found described in its proper place. If all means fail to deliver the foal alive, and one or the other must be sacrificed, cut the foal away, piece by piece; but if the foal is alive and the mare cannot be saved, the foal can be brought away by the Cæsarian operation. (See chapter on operations.)

Dead fœtus.—Sometimes the fœtus dies some considerable time before the full term of gestation is completed, and thus becoming a foreign substance, it must be removed. Sometimes, in such cases, the *os uteri* does not relax and needs assistance. This condition of affairs will be known by the mare's continuous and persistent straining, in the effort to expel the fœtus.

What to do.—Pass in your hand, after oiling it with olive oil, and insert one finger into the *os*, then two and three, and so on, working very gradually, till it is well dilated. If this does not succeed, insert a sponge wet with fluid extract of belladonna into the *os*, and let it remain there ten or twelve hours, and then try the hand again.

IX. Metritis, or Inflammation of the Womb.

This results from injury during parturition, or from catching cold by exposure to cold or wet soon after delivery. It usually comes on in two or three days after parturition. There is more or less fever; colicky pain; continually straining, as if to pass another foal; looking around towards the flanks; a discharge of foetid black fluid from the womb; and arched back.

What to do.—Give a mild purgative of raw linseed oil, in amount from a pint to a quart, according to the size of the patient. Wash out the womb with warm water, to which a little, a very little, whiskey has been added, and inject No. 39. Give No. 18 internally, as often as the fever and other symptoms require. Feed on light diet and keep warm.

X. Inflammation of the Ovaries.

This, though rare, is met with occasionally in the mare, and is manifested by slight fever, soreness on pressure in the lumbar region, and disinclination to walk. It usually occurs at the time of heat, and passes away when that is over; it aggravates the passions excited at that time.

What to do.—Give a teaspoonful of saltpetre in a bran mash, three times a day, for a couple of days.

XI. Leucorrhœa.

This is catarrh of the vagina or of the womb, or of both. Caused, originally, by a slight attack of inflammation, a discharge from the irritated surfaces is set up and soon becomes chronic. It often follows difficult parturition, in which the parts have been torn and injured, more or less. When the after-birth is retained, leucorrhœa invariably follows, owing to the irritation caused by the decomposition, which, in such cases, is nature's only alternative for getting rid of the foreign body.

The discharge is whitish and slimy, of a disagreeable odor; in fact, when following retention of the after-birth, it is often purulent, and very offensive. It tells heavily on the general health of the patient; she loses flesh; the coat becomes rough, coarse and staring; and the milk dries up, or nearly so.

What to do.—Introduce a catheter into the womb, and draw off the purulent accumulations, if any exist; next, inject tepid water, drawing it off with the catheter; then inject lotions Nos. 75, 76 and 39, changing from one to another, and applying them twice a day till cured. At the same time, give, as a course of tonics, Nos. 67, 35 and 22, changing occasionally from one to another. Continue them three or four weeks. Give green food, if practicable; if not, give bran mashes, roots, etc.

XII. Puerperal Fever.

This is a benign fever, usually occurring on the second or third day after parturition. It is aggravated by colds, exposure, or neglect.

How to know it.—The symptoms are those of general fever, accelerated pulse and respiration, with heightened temperature; the ears and extremities, however, are cold; the visible mucous membranes are injected and red; the bowels are constipated; the urine is scanty and high colored; secretion of milk is suspended; and the udder inclines to inflammation and hardness. It may occur in mares of all ages, but is most often met with after the first pregnancy, and seems to accompany the effort of nature in secreting the milk.

What to do.—Keep the animal warm, in a place with good ventilation but no drafts; give soft diet (grass if possible), and plenty of pure water with a tablespoonful of sweet spirits of nitre mixed with it morning and night. If the bowels are constipated, give half a pint of raw linseed oil, repeating it after ten or twelve hours.

XII. Mammitis.

This is inflammation of the mammary glands, or udder; it accompanies parturition, and then always exists to a certain extent, consequent upon the secretion of milk. It is apt to be most severe after the first foaling. Usually, the inflammation subsides in the course of a week or so; that is, as the organs become accustomed to secreting the milk, and their outside is softened by the foal sucking and pulling at the teats; but not infrequently it happens that, instead of getting better and softer, they get harder and larger, sore, hot and painful. When it runs on to suppuration of a quarter, as it sometimes does, the milk curdles and comes away with difficulty, in small quantities, and is bloody. There is always more or less constitutional disturbance, fever, accelerated pulse, etc.

What to do.—Foment vigorously with hot water, as continuously as possible; manipulate to the utmost extent that the soreness will allow; encourage the foal to suck and pull the teats, and milk all you can, at frequent intervals, to prevent the milk from curdling. If it goes on to suppuration, open the abscesses and inject lotion No. 39, twice a day, and apply oil-cake poultices, changing them morning and night. Give soft feed; if in winter, take the chill off the drinking water, and keep the mare blanketed. Give a teaspoonful of saltpetre in a bran mash morning and night. If the bowels are constipated, give a pint of raw linseed oil. Rub the glands with the following, three times a day:

No. 77.

1 Ounce camphor gum,

 $\frac{1}{2}$ Pint olive oil,**Mix.**

XIV. Hysteria.

This is a peculiar and quite rare nervous condition accompanying heat and manifested, principally, by the voluntary muscles. The jaws clamp; the teeth are ground; the muscles tremble; the legs and feet are liable to paw, strike or kick spasmodically; in short, the mare acts in a generally delirious manner. Sometimes the brain is so much affected that this condition runs on into tetanic convulsions, inflammation of the brain, and death.

What to do.—Give a quart of raw linseed oil, or else No. 23, and No. 52. Repeat the latter every four to six hours, till purgation takes place, when all unpleasant symptoms will usually disappear.

XV. Abortion.

When mares abort, it is usually the result of accident or overwork. If compelled to draw too heavy a load, a single extra hard pull is oftentimes sufficient to produce abortion; any such accident as slipping, falling, external violence, etc., may likewise bring it about. Usually, all parts come away naturally, without any untoward result other than nervous prostration, and, perhaps, a slight febrile rise in pulse and temperature for a day or two afterwards.

What to do.—Allow absolute rest for a few days, and give soft feed and chilled water. If any fever follows, give a teaspoonful of saltpetre in the mash, morning and night.

CHAPTER XX.

DISEASES OF THE LIVER.

- I. CONGESTION OF THE LIVER.—II. HEPATITIS, OR INFLAMMATION OF THE LIVER (ACUTE OR CHRONIC).—III. CEROMA, OR FATTY DEGENERATION.—IV. CIRRHOSIS, OR FIBROUS DEGENERATION.—V. JAUNDICE, ICTERUS, OR YELLOWS.—VI. BILIARY CALCULI, OR GALL-STONES.—VII. HYPERTROPHY.—VIII. ATROPHY.—IX. SOFTENING, OR RAMOLLISSEMENT, WITH RUPTURE.

Diseases of the liver in the lower animals, are not as common as in the human family, but they are met with occasionally, and their effects are plainly visible. The other organs of the body necessarily suffer when there is inactivity of the liver, since its functions are very important, both in eliminating impurities from the blood, and in secreting the bile that largely contributes to maintaining the health of the bowels.

Certain marked symptoms are common to all diseases of the liver, viz: yellowness of all the visible mucous membranes, dullness of spirits, languor, and loss of appetite. When the bile is secreted too abundantly, the fœces are bright yellow, with either diarrhœa, or a tendency that way; and when the bile is scanty, the fœces are of a gray, ashy color, hard and very offensive to the smell. Again, when the liver fails to secrete its customary quantity of urea, the latter is thrown back into the system, with especial detriment to the kidneys, giving rise to congestion of those organs or azoturia, (which see). The principal diseases of the liver, in the horse, are enumerated in the heading of this chapter.

I. Congestion of the Liver.

This is engorgement of the hepatic blood vessels, and, in a secondary manner, is accompanied by engorgement of many of the other internal organs. Its subjects are commonly high fed, pampered, idle animals. It is frequently a symptom of influenza, from obstruction of the flow of bile, caused by inflammation of the lining membrane of the bile ducts, which, in turn, is simply one manifestation of the general catarrhal inflammation of the mucous membranes of the whole body.

How to know it.—In addition to the general symptoms of hepatic disease, mentioned in the second paragraph of this chapter, there will be some colicky pains; turning of the head towards the right side; high brownish color of the urine; constipation; clay-colored fœces; an offensive smell to both fœces and mouth; and grinding of the teeth. Sometimes, there is also lameness in the right fore-shoulder, and more or less fever.

What to do.—Some authorities recommend bleeding and purgatives, except when it is a symptom of influenza. In case the animal is fat, bleeding would be an advantage. Follow it with No. 37, given in doses of two or three tablespoonfuls in soft feed, three times a day. Let the food be light and rather sparing.

When there are liver troubles, as a complication of influenza, it is not safe to give them any special treatment. In such cases, treat for influenza, as elsewhere given.

II. Hepatitis, or Inflammation of the Liver.

This may be either acute or chronic. It is very rare in the lower animals, among which it is most often seen in old horses. The inflammation may have its seat either in the covering membrane, known to anatomists as "Glisson's Capsule," or in the glandular portion itself. It may lead to abscesses, or to a hardening or softening of the organ. We will treat, first, of the acute form.

How to know it.—There is marked loss of appetite, and dullness of the eye; the patient usually remains standing, but hangs his head; the manure, passed in small balls, is of a dark reddish-brown color, and sometimes very much mixed with bile, covered with a slimy mucous matter; the urine is scant and high colored, and there is tenderness of the right side.

What to do.—In the acute form, give early, as a mild purgative, No. 23, and follow it with this:

No. 78.	2 Ounces chlorate of potash,
	1 Quart water,
	Mix.

Give four ounces (about two wine-glassfuls) three times a day. Feed on light diet.

The *chronic form* may follow the acute, or it may exist as an original disease. It gives rise to material changes in the liver, which may become enlarged and softened, or diminished in size and indurated and hardened. In those cases where it comes on gradually, and exists as an original disease, it is the result of want of proper food, or a process of gradual starvation, and tends to a fatal termination. If the food is insufficient and unsuitable, the fact will be shown by a poverty-stricken appearance of the animal generally.

What to do.—Give a complete change in every way possible—location and altitude, as well as in the quality and quantity of food.

III. Ceroma, or Fatty Degeneration of the Liver.

This is usually seen in old horses that are very fat. The liver becomes large and soft, and the hepatic cells becoming filled with fat, the secretion

of bile is interfered with. Here we find one of the causes of constipation and enteritis; for the bile is the main agent in keeping the bowels in order, including, also, the prevention of acidity and abnormal waste of the tissues composing them.

No treatment can be prescribed. These cases usually die suddenly, from rupture of the capsule and escape of blood into the abdominal cavity. Prevention might be effected by not allowing old horses to get too fat.

IV. Cirrhosis, or Fibrous Degeneration.

This is due, probably, to material changes in the blood, which becoming poor in quality and scanty in quantity, gives rise to atrophy of the system, pining, and death. On post-mortem examination, the liver is found to be light, and in color of a yellow cast, roughened on the surface, firm to the touch, not so easily broken down as in a healthy condition; it is hard, fibrous and dry; and, when cut across, the lobules are replaced by white fibrous tissue, exhibiting a mottled appearance, like the interior of a nutmeg. No specific treatment is possible.

V. Jaundice, Icterus, or Yellows.

This is only a symptom of derangement of the liver, though commonly spoken of as a separate disease. It indicates an obstruction of the gall duct that conveys the bile into the intestines, the consequence of which is, that the bile is thrown back into the system, and hence the yellow appearance so characteristic of all liver disorders.

If it is not complicated with any other disease, give a purgative, No. 23, and follow it with No. 37. If, however, it exists as a complication, treat the other disease rather than this condition.

VI. Biliary Calculi, or Gall-stones.

Though gall-stones are rarely found, incrustations on the walls of the ducts are quite common. They do little or no harm, unless they accumulate to such an extent as to obstruct the duct, in which case there will be colicky pains, frequent looking around to the right side, and a yellow, bilious appearance generally.

Give No. 55.

VII. Hypertrophy of the Liver.

This, which is the name given an abnormal growth of the organ, is usually associated with a plethoric condition, resulting from idleness and high feeding.

Reduce the flesh, by giving No. 23, and restricting the diet.

VIII. Atrophy of the Liver.

This is a wasting, shrinking, pining away process. Its causes are either some other disease, or else starvation. If the former, treat the other disease, and the system may, perhaps, redevelop. If starvation and neglect are to blame, make a radical change, giving good food, and plenty of it.

IX. Softening, or Ramollissement, with Rupture.

This is probably due to repeated attacks of congestion and engorgement. The softening process goes on, till finally the inevitable sequel of rupture takes place. Sometimes the rupture does not involve Glisson's capsule, but only the glandular matter, and when this occurs, it will be manifested by colicky pains, and also by fainting fits, if the head is raised suddenly. The symptoms subside after a while, and appear to leave no injurious consequences. When, however, Glisson's capsule is ruptured, hemorrhage into the abdomen occurs, and a fatal termination suddenly ensues.



TEST FOR HEMORRHAGE FROM THE LIVER.

Prevention.—Recognizing that all affections of the liver leading to softening and rupture, are due to improper feeding, the methods of prevention are evident, viz: Regulate the diet carefully, reducing the quality of rich and specially nutritious foods, and giving more hay, straw, etc., and thus keeping down the tendency to undue obesity.

CHAPTER XXI.

DISEASES OF THE EYE.

- I. SPECIFIC OPHTHALMIA, OR MOON BLINDNESS.—II. SIMPLE OPHTHALMIA, OR CONJUNCTIVITIS.—III. AMAUROSIS, GUTTA SERENA, OR GLASS EYE.—IV. GLAUCOMA.—V. IRITIS.—VI. LEUCOMA.—VII. CATARACT.—VIII. FILARIA OCULI, OR WORM IN THE EYE.—IX. ENTROPIUM.—X. ECTROPIUM.—XI. TORN EYELIDS.—XII. CANCEROUS TUMOR IN THE EYE.—XIII. OBSTRUCTION OF THE LACHRYMAL DUCT.

Diseases of the eye are not nearly as numerous among the equine race as in man, though it would be a mistake to infer from this that the eye is a less sensitive or complicated organ in the one than in the other. The ocular diseases of the horse are about all included in the list above given.

I. Specific Ophthalmia, or Moon Blindness.

This is the bane of horse-flesh in the West, where a multitude of good horses lose their sight from an hereditary disease that is utterly incurable, and runs on its certain course, fast or slow, to cataract. It consists of inflammation of the cornea, choroid coat, ciliary processes and iris, affecting, also, the humors and lens, and giving rise to an immense amount of pain on account of the intro-ocular pressure.

It is called *specific* on account of its occult cause, nature and periodicity. While it is transmissible to the offspring from either parent, it is especially so from the sire.

How to know it.—There is swelling of the whole eye, lids, conjunctiva, the mucous lining of the lids, and all internal parts of the eye; and the cornea being inelastic, the pressure and pain are intense. The eye is closed, or nearly so, from the light, tears run down over the cheek, and the mucous membranes become very red; and as a result of the inflammation, pus is formed in the anterior chamber, and may be seen as a whitish substance down in the lower portion.



MOON BLINDNESS.

After a few days, the inflammation subsides, goes away, and leaves the eye nearly as bright as natural; still, if examined carefully, shreds of the lymph will be seen hanging around in the anterior chamber, and the pupil will be ragged. After a period of from

four weeks to three or four months, the trouble will recur with all the symptoms in an aggravated degree; the whitish substance (lymph) becomes purulent, and, settling at the bottom, may

there be seen like a half-moon. Examine the eye by the light of a candle, (the horse being in a dark place,) and the cornea will look dull, and the back of the eye bluish yellow. These appearances, accompanied by the recurrences from time to time, will plainly stamp the disease as specific or periodic ophthalmia. It may affect either eye alone, or both at the same time, and the periodic recurrence may either be noticed first in one and then in the other, or else always in the same one. After one or more recurrences, the lymph or pus in the bottom of the anterior chamber will remain. The pupil becomes uneven, the eye looks smaller, on account of its being drawn back into the socket to avoid the light, and before long, as a result of the inflammation, the fatty cushion at the back of the eye becomes absorbed. After a few recurrences, there is perceived a muddiness around the lens, which increases in opacity with each successive attack, till a cataract forms. This is the inevitable result. Then the intensity of the attack diminishes, and finally subsides altogether.

What to do.—There is no treatment known that will absolutely cure it; yet good attention will ward off the final termination for a long time. When first coming on, give a purgative, No. 23, and follow it up with this :

No. 79. 1 Drachm potassium iodide,
 $\frac{1}{2}$ Pint water,
 Mix.

Give this as one dose in a bran mash or from a bottle. Repeat it three times a day for a fortnight. Feed on bran mashes, green food, roots, etc. Bathe the eye with hot water an hour at a time, three times a day. Apply the following lotion to the eye, with a camel's hair brush, four or six times a day :

No. 80. 2 Grains sulphate of atropia,
 1 Ounce water,
 Mix.

Keep the animal in a dark place, with plenty of water to drink. When the active inflammation has subsided, use the following lotion :

No. 81. 5 Grains nitrate of silver,
 1 Ounce water,
 Mix.

Apply with a camel's hair brush, twice a day for a week or so, which will help to take up the cloudiness that may remain from the inflammation. If this object is not satisfactorily effected, apply No. 82.

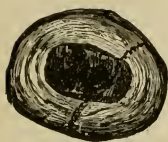
Prevention.—Never breed a mare affected with specific ophthalmia, not even when she is stone-blind and all danger of subsequent recurrences gone. Never breed to a stallion similarly affected. Its hereditary character is certain. It breaks out in the offspring, usually, between the ages of four and seven, most often at about six.

II. Simple Ophthalmia, or Conjunctivitis.

The lining of the eyelids is a sensitive, vascular, mucous membrane called the conjunctiva. Inflammation of this membrane and the other external parts is known as simple ophthalmia, or conjunctivitis.

Cause.—The most common cause is the introduction of foreign bodies into the eye, such as hay-seed, hair, cinders, lime or other caustic substances, etc. It often accompanies other diseases, as a symptom of fever, the conjunctiva at such times sharing with all other mucous membranes in the tendency to congestion.

How to know it.—The eye is kept partly or nearly closed, the eyelids are swollen, the tears flow copiously down the cheek, and when the lids



SIMPLE OPHTHALMIA.

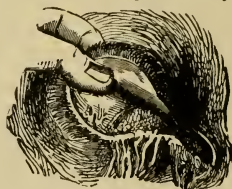
The pupil natural, but the line showing the position of the haw, it being drawn well up on the eye, in its endeavor to brush off the foreign body.

are opened the lining is very red and inflamed, with the haw drawn well up on the eye. After a day or two, the surface of the cornea (the transparent portion of the eyeball) becomes clouded with a whitish film-like substance, caused by the interrupted nutrition which attends the inflammation and tumefaction.

If neglected, the opacity increases and soon becomes chronic, resisting treatment, and causing blindness. Sometimes, when the irritant is very severe, the inflammation extends to the interior of the eye, breaking down the structure of the parts, when blindness

results, as a matter of course.

What to do.—Make a careful examination, and remove the offending object. Foreign bodies can be removed with forceps, or by a silk handkerchief passed over the head of a pin. The forceps should be curved, and the curved surface applied to the eye, so as to avoid the possibility of puncturing the points into it. If so much swollen that the foreign body cannot be discovered, the point where it is will be apt to be more swollen than the rest, thereby giving a clue as to its location. If it is down under the haw, the latter may be caught by a hook or tenaculum, and drawn up so as to allow complete examination of the surfaces beneath. It is often necessary to fasten the haw, to prevent its movements from interfering with the examination of the eye.



MANNER OF OPENING THE EYE WHEN SEARCHING FOR FOREIGN BODIES.

After the irritant is removed, bathe the eye with warm water having a small quantity of salt in it,—a teaspoonful of salt to a pint of water; have the water and sponge clean, and foment the eye half an hour at a time, three or four times a day. Insert a flaxseed under the lid several times a day, or smear across and into the eye the white of an egg.

If the cornea becomes cloudy, apply the following lotion morning and night, with a camel's hair brush.

No. 82.	10 Grains nitrate of silver,
	1 Ounce water,
	Mix.

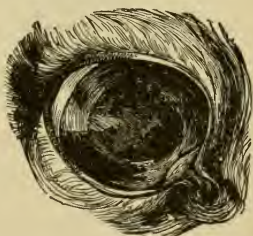
Apply lotion No. 80, six to eight times a day, with a camel's hair brush, all around under the eyelids and upon the eyeballs, to prevent the extension of the inflammation to the inner parts of the eye, or to alleviate it, if this has occurred. Give the animal rest, with soft feed and a dark stall.

III. Amaurosis, Gutta Serena, or Glass Eye.

This is blindness from paralysis of the optic nerve (the nerve of the sense of sight) and retina. The latter is the expansion of the optic nerve over the back of the chamber of the eye. There is no alteration in the structure of the eye, but simply loss of power to see. The pupil is greatly dilated, indicating the eye's insensibility to light, and has a very clear, bright appearance, like blue glass; and instead of contracting and expanding, as it should do, in different degrees of light, it remains fixed.

Cause.—It may depend upon injury to the brain, with effusion pressing on the optic nerve, and when this is the cause, the appearance of the eye above described will be noticed. Or it may result from excessive fever in any disease, and especially epizootic influenza, if the temperature of the body runs above 106° . In the latter case, the retina is involved in the inflammation, loses its beautiful bluish lustre, and becomes whitish-green in color, and the humors (the liquids) of the eye get more or less muddy, and give a greenish cast to the whole eye.

As this condition may not be detected by a casual observer, by looking into the eye itself, it is necessary to notice closely the actions of the horse. It may effect one or both eyes. If only one, the horse's action may not be altered, but if both eyes are blind the fact will be betrayed by his high stepping and his constant moving of the ears forward and backward. These are indications which should always create suspicion in this respect.



EYE AFFECTED BY SERENA.

What to do.—Apply a blister, No. 9, to the cheek or temple, and on the back of the neck, and give internally Nos. 67 and 66 in alternation. But a cure is rarely to be hoped for.

IV. Glaucoma.

This is inflammation involving the whole globe of the eye, but more particularly the vitreous humor, (the fluid in the posterior chamber of the eye,) the iris, choroid, and sometime the retina. It occasions a dilated, irregular pupil, muddiness of the vitreous humor, and a sea-green color of the interior of the eye, with blindness as a frequent sequel.

What to do.—It is treated by constitutional remedies—calabar bean, electricity, etc., and also by iridectomy (an operation to excise a portion of the iris, to relieve the intro-ocular pressure.) These measures all require the skill of a veterinarian.

V. Iritis.

Inflammation of the iris (that portion of the eye forming the pupil and giving the color to the eye) is called iritis.

Cause.—Severe external violence, extremes of light and darkness, exposure to severe storms, facing the wind, and constitutional disorders.

How to know it.—A pink ring is seen around the sclerotica (the white, fibrous coat forming the large posterior portion of the eye); the eye is retracted and partly closed; the haw is drawn up; the conjunctiva is inflamed, there being considerable fever in the constitution; the pupil is very small, and the aqueous humor becomes turbid, with white flakes floating in the anterior chamber, and usually a little pus in the bottom of the latter.



MANNER OF SHADING A HORSE'S EYES WHEN SUFFERING FROM INFLAMMATION.

What to do.—Place the animal in a dark stall, or cover his face with a green cloth. Give a purgative, No. 23. Bathe the eye with warm water as much as possible, and apply No. 80 every few minutes for half an hour; then rest four or five hours, and repeat it. So continue from day to day, till all symptoms of inflammation are gone. Let the feed be soft and unstimulating.

VI. Leucoma.

This is a white opacity of the cornea, from extravasation of lymph into the fibres of the extension of the conjunctiva over the cornea. It may be the result of other eye diseases, of fever in the system, or of external violence. It is best treated by keeping in a dark place, with laxative food and continuous application of No. 82, till it is cleared up.

VII. Cataract.

As the most common termination of all inflammatory diseases of the eye, we see a white opaque substance covering the lens, and oftentimes completely filling the pupil. This is cataract, of which there are two kinds, distinguished by the terms capsular and lenticular, according to their position. Cataract is organized lymph attached to the lens.

How to know it.—Usually the pupil is very much dilated, and filled with the white lymph, the defect being so plain as to be seen a hundred feet away. Sometimes, however, it can only be detected by a close examination. Examine the horse, first, in strong sunlight, and note carefully the degree of contraction of the pupil; then place him in a dark stall, and examine the eye with a candle. A healthy eye reflects three candles, the first from the cornea, the second from the surface of the lens, the third from the back of the lens. When either or both of the last two are blurred or, worse, entirely wanting, you need no further proof of the existence of cataract.

What to do.—In recent cases, the eye may sometimes be cleared up by simply giving a purgative, No. 23, and applying a lotion, No. 82, at the same time giving No. 66, internally; but in later stages nothing could avail except to dissect them out—an operation that is never practiced on the horse for the reason that, without glasses, he would never be able to see things again, in their right position, size and form.



A FREQUENT RESULT OF IMPERFECT VISION.

Imperfect vision is worse than blindness, being vastly more misleading and wholly unreliable.

VIII. *Filaria Oculi*, or Worm in the Eye.

This is a small, thread-like worm, seen floating about in the aqueous humor in the anterior chamber of the eye. It is very rare. The worm

is from half an inch to two inches in length, and the size of a hair. It is white in color, and is very active, squirming about in the eye, apparently very much at home. It is probably taken into the stomach in the egg form, and after hatching, the mite works through the coats of the intestines and blood vessels, is carried by the circulation till it finds an agreeable medium, and there develops. It causes a great amount of inflammation and pain in the eye, in which it can be plainly seen by any observer.

What to do.—The only remedy is to puncture the cornea and evacuate the anterior chamber, when the worm will come out along with the other contents. This, however, is a delicate operation, and should never be attempted by any but a qualified veterinary surgeon. (See chapter on operations.)

IX. Entropium.

This is inversion of the eyelids, causing the lashes to turn in upon the eyeballs, and giving rise to an irritating disease called *Trichiosis*. It is due to excessive thickness of the lid above the rim, so that the rim is made to turn in.

What to do.—It is treated by cutting out an elliptical section of the skin, and sewing the wound up again, to shorten the lid. Let the long axis of the ellipse run lengthwise with the eyelid, horizontally.

X. Ectropium.

This trouble is consequent upon an inflamed and thickened conjunctiva. It is a turning out or eversion of the lids, showing their red mucous membranes continually. It is most common in the lower lid. It is treated by an operation to remove an elliptical section of the conjunctiva, the after treatment being the same as prescribed for simple ophthalmia.

XI. Torn Eyelids.

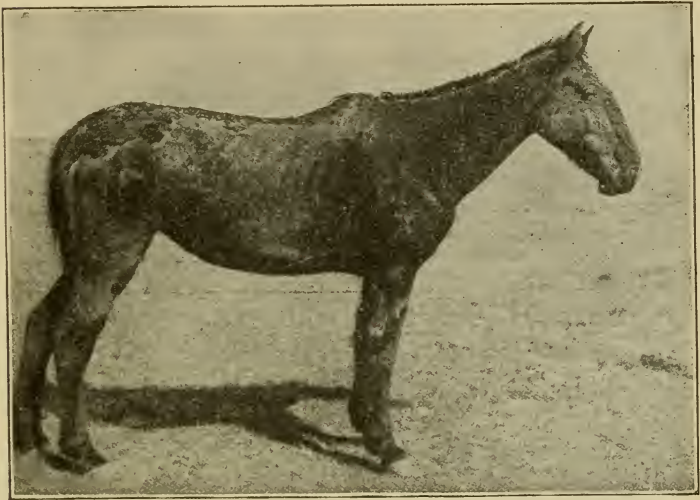
The lids are frequently torn by getting caught in hooks, nails, etc. When possible, sew them up at once. Bring the edges neatly together and sew them with fine silk, making fine stitches, and dress two or three times a day with lotion No. 39. Tie the horse in the center of a wide stall, with a line from each side, and let him eat off the floor, to prevent him from rubbing his head and tearing the laceration open again.

XII. Cancerous Tumors in the Eye.

These, though rare, are occasionally met with in the horse, and their only treatment is to extirpate them by cutting out the eye. Cancerous growths are always malignant, and spread to surrounding tissues. (See chapter on operations.)

XIII. Obstruction of the Lachrymal Duct.

This duct is the one that carries off tears and superfluous moisture from the eyes to the nose. It runs from the inner corner of the eyelids to within two or three inches of the nostril, and empties on the floor of the nasal passage. It occasionally becomes stopped up from extension to it of the inflammation attending catarrh, and then the tears, having no



MARE SHOWING CHARACTERISTIC LESIONS OF DERMAL MYCOSIS.
(Disease of Skin Caused by Microbes.)

other channel of escape, may be seen flowing down over the cheek.

What to do.—See if there is any mechanical obstruction in the nose, and, if so, remove it; if not, swab out the nostril with an infusion of tobacco. Should this fail, the duct must be opened with a probe. Take a fine elastic probe, about the size of a knitting needle, and a foot long, and insert it once a day for several days, and inject No. 73 with a fine syringe.



OBSTRUCTION OF
LACHRYMAL DUCT.

CHAPTER XXII.

PARASITIC DISEASES OF THE HORSE.

I. INTESTINAL WORMS.—II. BOTS.—III. LICE.—IV. MANGE.—V. RING-WORM.

I. Intestinal Worms.

Three kinds of tape-worms and seven of round worms have been found in the intestines of the horse. The tape-worms are very rare, and hence have but little interest for the average reader. But the round worms are both very common and highly injurious to the animal harboring them.

Pin-worms or ascarides.—The most noteworthy is the pin-worm, of which two kinds are very common, viz.: *Sclerostomum Equinum* and *Oxyuris curvola*. These, which are usually spoken of as *ascarides*, are small round worms about an inch and a half to two inches long, pointed



HORSE IN LAST STAGE OF INFECTIOUS ANEMIA.
(A Deficiency of Blood in the System.)

at both ends, with a small black head. They inhabit the large intestines (the rectum usually, and sometimes the colon), where they often exist in large numbers, some of them being passed, also, from time to time, in the dung.

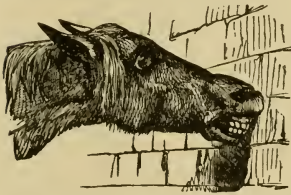
Teres Lumbrici.—The next most common worm is the large round worm scientifically known as *teres lumbrici*, which are about as thick as a clay pipe-stem, and, as to length, about eight to twelve inches for the male and about ten to eighteen inches for the female. They infest the

small intestines, and frequently enter the stomach, but from the fact that they seldom exist in very large quantities, commonly do somewhat less damage than the *ascarides*. Nevertheless, the writer has occasionally seen them come away by the hat-full, after a heavy dose of vermifuge.

How to detect their presence.—When in small numbers, their existence is hardly ascertainable, but when in large numbers, their presence will be betrayed by a capricious appetite, usually a ravenous one; emaciation, with dry, coarse, staring coat, and a pot-belly; a whitish-yellow mould will be seen around the anus, probably made by worms being crushed while passing out, leaving their contents sticking to the skin, and, usually, more or less of the worms will be seen in the dung. When they get into the stomach, the horse will turn up his upper lip, as if nauseated, and will also rub his lips against the wall, manger, etc.; he will lick the wall, sometimes even lick the hair off himself, and will persistently rub his tail or keep switching it around, and otherwise manifesting the irritation that exists in the anus and rectum.



APPEARANCE OF COLT SUFFERING FROM WORMS.



HORSE RUBBING HIS NOSE AGAINST A WALL—A SYMPTOM OF WORMS.

Giant Strongle.—Another round worm occasionally observed in the horse, is the giant strongle, (*Eustrongylus Gigas*,) found, most commonly, in the kidneys and bladder. But sometimes, after having completely devoured a kidney, this rapacious parasite bursts the capsule, and falling into the abdominal cavity, there floats about among the intestines.

It then causes peritonitis and death. These worms are as large as a man's big finger, and from one to three feet long. Their color is a bright pink.

What to do for worms.—There are numerous useful vermifuges. The most convenient and effectual is the following:

No. 83.	1 Drachm sulphate of iron,
	1 Drachm tartar emetic,
	2 Drachms linseed meal,
	Mix.

Give as one dose, repeating it morning and night for a week ; then give a purgative of oil and turpentine, as follows :

No. 84. 1 Ounce spirits of turpentine,
 1 Pint raw linseed oil,
 Mix.

Give as one dose.

After three weeks, repeat the entire treatment, to catch the young worms previously left in the bowels, in the form of nits or eggs, and which have hatched since.



Nasal and bronchial acari.—One sort of acarus is found in the nose of the horse, and another, the *strongylus micrurus*, in the bronchial tubes. They are from one and a half to three inches long.

II. Bots.

TEASTOMA TENOIDES.

Acarus which
lives in the nose.



THE GADFLY.

The *æstrus equi*, or horse gadfly, in laying its eggs, attaches them to the hair of the horse, usually on the fore legs and breast, so as to be convenient to the horse's mouth. The horse licks the spot irritated by the fly and thus gets one or more eggs into his mouth ; it is hatched by the heat and moisture, passes down the gullet, and attaches itself to the coat of the stomach by two little hooklets on the head, and there hangs for several months, as yet not having the power to let go. This is one of the stages it has to go through, to become a fly. When it has matured, it lets go, and soon passes out with the dung. It then hides itself in the earth, to undergo another change, and after six or seven weeks' growth, in the pupa condition, emerges a full fledged gadfly, capable of



A BOT.

annoying many horses and propagating its species indefinitely.



1

2

3

4

5



1. Female fly about to deposit an egg,
2. The egg magnified.
3. The bot.
4. The chrysalis.
5. The male fly.

THE GADFLY, AT VARIOUS STAGES OF DEVELOPMENT.

The bot sucks liquid nourishment from the food of the horse, and

never, as is popularly supposed, eats the stomach ; for the holes found in the stomach soon after the death of a healthy animal, are really caused by the action of the gastric juice,—in fact, a kind of self-digestion by the stomach itself.

The only harm bots can do is to accumulate in such large quantities in the stomach and bowels as to interfere with digestion and the free passage of the feces. In such cases a purgative may prove advantageous.

No specific treatment is necessary. Feed well.



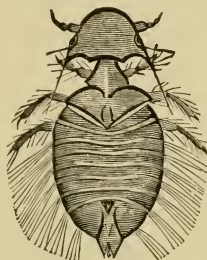
BOTS FASTENED TO THE STOMACH, UNABLE TO LET GO.

III. Lice.

All animals suffer from the ravages of external parasites, the most common of which are lice. They are wingless insects, divided into two classes, *blood-suckers* (*Hematopinus*) and *Bird-lice* (*Trichodectes*.)



HEN-LOUSE, OR DERMANYSSUS OF THE HORSE.



GONIODES STYLIFER OF THE TURKEY.

The former have narrow heads and long, trunk-like sucking tubes ; the latter, very broad heads and biting jaws, but no sucking tube. Lice always impoverish the animal they infest, causing loss of flesh and general unthriftiness. Our four cuts of them are, of course, greatly magnified.

What to do.—The safest and most effectual remedy is a tobacco infusion, made as follows :

- No. 85. 2 Pounds tobacco,
 3 Gallons water.
 Mix, and steep for two hours.

Sponge the animal thoroughly. Or the following may be used in the same manner :

- No. 86. 3 Pounds quassia chips,
 1 Gallon water,
 Mix, and steep one hour.

IV. Mange.

This is a parasitic disease that is due to a class of insects called *acari*, of which there are three kinds that trouble the horse, viz: the *sarcoptes*, *dermatophagus* and *dermatocoptis*. The first named burrows in the deeper layers and cracks of the skin, while the last two live on the surface, under the scabs, where, of course, they are more easily got at than the former, and hence are less difficult to treat.



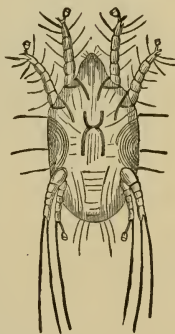
HEMATOPINUS, OR
BLOOD-SUCKING
LOUSE OF THE
HORSE AND ASS.



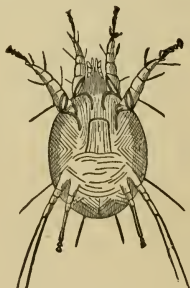
TRICHODECTES
OR BIRD-LOUSE
OF THE HORSE.

How to know it.—There is a terrible itching that cannot be satisfied; the more the horse rubs, the more he itches. Horses with the mange

will sometimes be found turned out to pasture, and rubbing and scratching against posts, trees, fences, etc., or even against one another. As



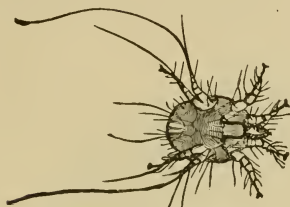
DERMATOPHAGUS EQUI.



DERMATOCOPTES EQUI.

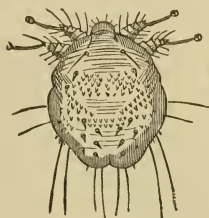
the mites possess great vitality, and will live a long time away from a horse, those left on the posts, etc., will infest any other horse coming in contact with it weeks, or even months, afterward. Mange is contagious by actual contact. The skin gets rough and scaly; the hair comes off in patches; the skin gets pimply, and when rubbed much, gets quite raw. It usually affects the head and neck first, sometimes spreading so as to take the hair entirely off. Its spread is quite rapid, and keeps the horse in agony all the time. He will push against your hand, in evident

pleasure, when you scratch the affected part; and this constitutes a good test for mange. (See cut below.)



MANGE MITE (MAGNIFIED.)

As given by Doctor Erasmus Wilson.



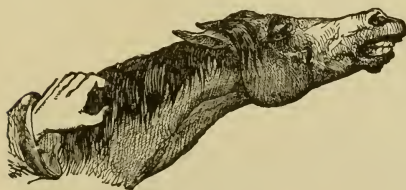
SARCOPTES EQUI.

What to do.—Wash the parts affected with hot water and strong soap, to remove all scabs and scurf; then, when dry, rub well in to all affected spots the following mixture:

No. 87. 4 Ounces sulphur,
 2 Ounces oil of tar,
 ½ Pint linseed oil,
 Mix.

V. Ringworm.

This is a fungous, vegetable parasitic growth, scientifically known as *trichophyton tonsurans*. It is contagious, and attacks all classes of animals, yet sometimes arises spontaneously from poverty and filth. It manifests itself by a round bald spot, scaly and elevated inside the ring, which is red and inflamed. It begins in a small pimple-like sore, which spreads very fast, increasing in size from day to day, and new sores forming on other parts of the body. The ring



TEST FOR MANGE.

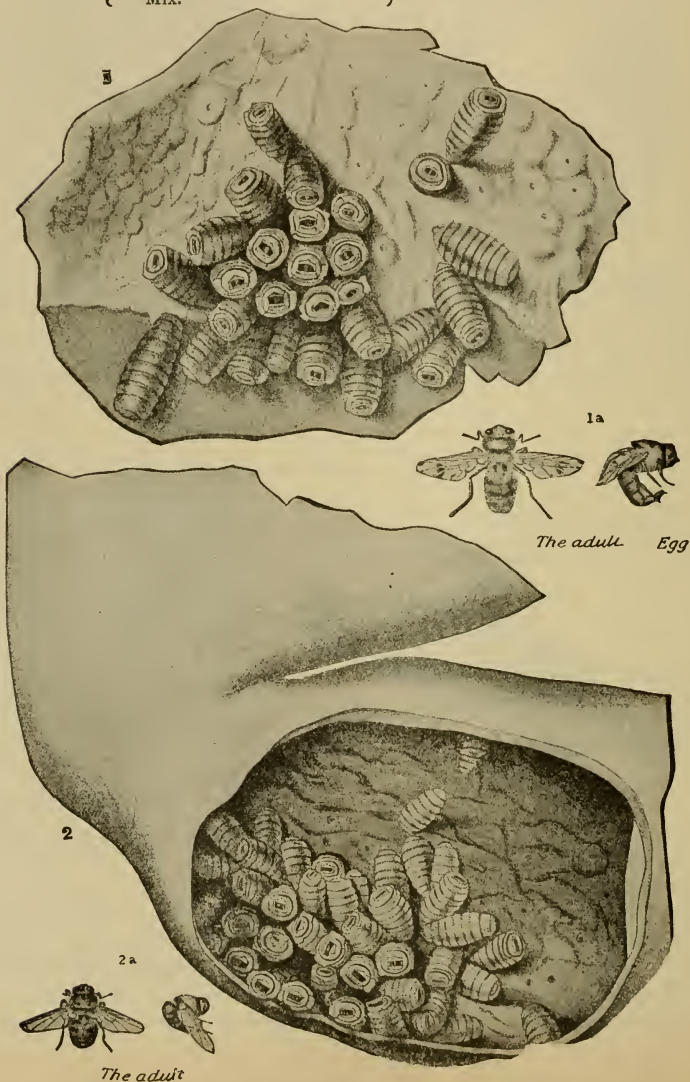
is surrounded by a row of broken, bristly hairs, which split, and become filled with spores of the fungus; and as fast as one row of hairs is disposed of another row is attacked.

Ringworm is, at first, simply a disfigurement, but it should, on no account, be neglected. If allowed to run on, it becomes very troublesome. The scurfy skin of ringworm is easy of recognition, the particles of scurf coming off in little flakes or scales, which have been aptly compared to the coarser, husky portions of bran.

There is another form of ringworm called *favus*. It shows the same general appearance of the other, except that a scab forms in the center, after the ring has receded.

What to do.—Wash with soap and water; when dry, paint with tincture of iodine or the following:

No. 88. { 40 Grains corrosive sublimate,
1 Pint water,
Mix. } Repeat once a day till cured.



The adult
BOTS. 1, Bots in the Stomach. 2, Bots in the Duodenum, or Intestine.

CHAPTER XXIII.

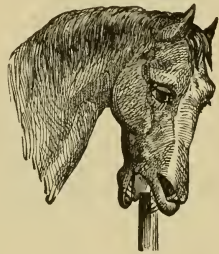
VICES IN THE STABLE.

. CRIBBING.—II. WIND SUCKING.—III. GNAWING THE MANGER, CLOTHING, ETC.—IV. KICKING WHILE EATING GRAIN.—V. WASTING THE GRAIN.—VI. PULLING BACK, AND BREAKING THE HALTER.—VII. BALKING.

Horses frequently contract pernicious habits in the stable, such as always prove very annoying and often incurable. Nevertheless, a little ingenuity will sometimes work wonders, not only in preventing the formation of such habits, but also in breaking them up. The most common stable vices are those above noted.

I. Cribbing.

This is a habit of catching hold of the manger, post, fence, or other object in front of the horse, with the teeth, and bearing down till the neck is altered in position, so as to form a temporary vacuum in the pharynx, when the air rushes in to fill it, making a sound not unlike the hic-cough. It frequently occurs that the horse will devote nine-tenths of his time to cribbing, to the neglect of eating and sleeping, especially if at grass, and bringing on indigestion, emaciation and hidebound. For this reason, cribbers are usually thin in flesh.



CRIBBING.

Cause.—Cribbing is considered by some to be the result of indigestion; by others, of pain in the teeth while teething; and by others still, of idleness. While there are cases that undoubtedly seem traceable to the first two mentioned causes, the writer thinks this habit will be found, uniformly, to be associated, at least, with idleness. Old horses sometimes take it up, and horses of all ages are apt to do so, if tied beside a cribber; but in every such case idleness seems to be a prerequisite. This opinion is strengthened, too, by the undeniable fact that a horse kept in the stable several weeks, from some trivial cause, is especially apt to acquire it.

What to do.—There are many devices in vogue for the cure of cribbing, each containing more or less merit,—such as a piece of buffalo robe, or of iron, nailed on the edge of the manger; red pepper smeared over the latter; a small strap around the throat, drawn very tight, etc. But the most effectual plan is to tie him in a wide stall, with a line from

each side, to keep him in the center, and feed him on the floor. Some horses, however, will crib lying down; or, if tied too short to reach the floor, will sometimes crib on their own knees. The writer saw a horse tied in front of the Board of Trade Building, in Chicago, that was checked up so short that he could not reach the flag sidewalk; so he would put one foot up on the walk and crib on his knee, which he was just able to reach. He would stand there, and do this by the hour. Cases so inveterate are not curable. Give internally, as treatment for the stomach, the following:—

No. 89.	2 Ounces bicarbonate of soda,
	1 Ounce gentian root, powdered,
	2 Ounces linseed meal,
	Mix.

Give a tablespoonful morning and night, in soft food, and give plenty of exercise. Old, long standing cases are obstinate, but those more recent may generally be cured by the above treatment, if persevered in.

Prevention.—Avoid long-continued idleness, and also overfeeding on strong, heating grain. A horse, to be kept in health, should be exercised every day, and fed according to the work performed.

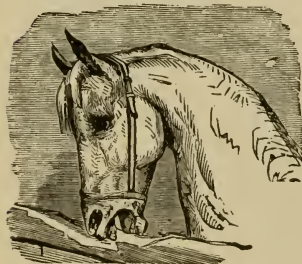
II. Wind-sucking.

This is similar to cribbing, which it often accompanies, but the horse may suck wind without cribbing. He arches his back, curves his neck, draws in his chin towards his breast and down goes a swallow of air into the stomach; this continues, usually, till he is so bloated that he is like a barrel, and cannot hold any more. It is injurious, as being apt to cause indigestion, colic, emaciation, hide-bound, etc.

Give No. 89 in soft food. This may help the case; still, wind-suckers are generally incurables.

III. Gnawing the Manger, Clothing, etc.

This habit, and especially gnawing the manger, is formed in idleness, or else indicates the want of salt. Tearing the blankets sometimes comes simply from being too warm, especially if the horse is fat; the skin gets hot and itchy, and he would be more comfortable without a blanket, and perhaps should have medical treatment, constitutionally.



GNAWING THE MANGER.

What to do.—Give him plenty of work, and feed accordingly. If he persists in the habit, smear the manger with assafoetida, or make it of iron. If a

blanket is really necessary, he can be prevented from tearing it, by tying a stick from his cheek to the surcingle.

IV. Kicking while Eating Grain.

This is another outgrowth of continued idleness, in connection with a nervous disposition. The horse, while eating his grain, will kick the side of the stall, sometimes as often as four or five times a minute. This he usually does with one foot, but sometimes with both,—first one and then the other.

What to do.—A piece of chain, a foot or so in length and tied to the pastern of the foot used, will sometimes prove effectual. Another plan which usually answers the purpose, is to run a small rope from the bit through a collar and surcingle to the foot. Or, a small bit may be used, —one that will not interfere with the eating. Whipping is useless.

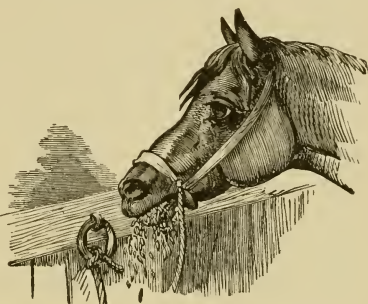
V. Wasting the Grain.

This is a playful habit of taking up the grain into the mouth and sifting it out again, throwing it around much as a child would the bread and butter of which he had too much.

As a rule, it shows that the horse has too much grain and too little exercise; he is fed more than he needs or can relish. A horse will not do it till he is fat and cloyed, except, perhaps, in occasional instances of irregular or decayed teeth. Treatment for these exceptional cases is given in the article on teeth.

What to do.—The treatment consists in removing the cause; give more work and less grain.

Sometimes a hard-worked, ravenous horse will plunge his nose into a mess of oats and throw half of them out, from sheer irritability of temper. Treat him kindly, however; place a large angular stone, the size of a man's double fist, in the center of the manger, and put the oats in with it, which will compel him to go about the matter more leisurely, and prevent him from throwing the grain out.



PLAYING WITH THE GRAIN.

VI. Pulling Back, and Breaking the Halter.

This very bad habit commonly originates from the horse getting frightened, when, jumping suddenly back, he breaks the halter; and as average horse sense knows that a thing once done can be done again, the jerk is repeated, in sportiveness or mischief, till it becomes a confirmed vice.

What to do.—Have a very strong halter, and tie high on the manger, which will give the horse less power to pull than when tied low. Some

recommend a small rope, passed under the tail and tied to the manger, which may act well in some cases. But the main point lies in so fastening him that he cannot get away, when, after a few ineffectual attempts, he will give it up.

In halter breaking a colt, pass a rope behind him, so that he cannot pull full strength on the halter, and be very sure nothing is used with him that will break; one accident of that kind may be enough to start a persistent bad habit.

VII. Balking.

This, though not strictly a stable vice, is so nearly allied thereto that it seems quite proper to treat of it in this connection. The best way to break a horse of balking is not to be in a hurry, but, rather, to let him stand to his heart's content; avoid hitching him to any load he cannot pull easily; coax him and pat him; feed him apples, salt, sugar, etc., out of your hand. Let the same man always handle him, if possible; a change of drivers might spoil all that has been accomplished. If there is no time to wait for him, hitch another team ahead of him and snake him along. The chain, or even rope, passed around his neck for the other team to pull by, is very effectual. Try and divert his attention by offering a handful of salt or oats; or, even a handful of earth may serve every purpose.

The maxim always to be observed in all of these cases is: Treat the horse with kindness. A balky horse cured by kindness, an achievement not only possible but absolutely feasible, is the best, toughest, most persevering creature in existence, from the fact that only horses possessed of a great amount of spirit and determination ever get balky, those that resent and resist abuse. It is abuse, generally speaking, that makes a horse learn to balk,—such foolish and barbarous work as getting into a hole with a heavy load, and then whipping unmercifully, to try and make the poor dumb victims perform impossibilities. Let the reader set it down as an axiom, that kindness is always repaid by faithful service.

CHAPTER XXIV.

CONSTRUCTION AND MANAGEMENT OF STABLES, AS RELATED TO HYGIENE.

I. NECESSITY FOR STABLES.—II. CONSTRUCTION OF STABLES.—III. FEEDING AND WATERING STOCK.—IV. THE CARE OF STOCK WHEN IN STABLE.—V. ADDITIONAL DIRECTIONS FOR GIVING MEDICINES.—VI. DETECTION OF DISEASE.

I. Necessity for Stables.

In many regions and climates, stables are not necessary; horses, mules, cattle and all kinds of stock lie down to rest and sleep in the open air, under cover of the blue sky, or, if they have any shelter, they find it for themselves, in groves, edges of forests and canons. In some countries yards or corrals are made, and the stock driven into them at night, to keep them from straying, and from being attacked by wild beasts.

In this country, and especially in the northern and central States, stables are indispensable, as a protection from cold, sudden changes and severe storms. They are tokens of civilization and Christianity, the result of a humane disposition to provide comfortable—sometimes even luxurious—quarters for the animal dependents as well as for the family.

II. Construction of Stables.

The construction of the stable, in all its various features, including the arrangements for its drainage and ventilation, as well as stalls, mangers, etc., is of great importance, as bearing directly upon the health, as well as the comfort, of the animals. Mistakes in stable construction are often the unsuspected cause of lameness, of disease, and even death. Hygienic considerations should, therefore, have their full weight in planning and building a barn.

Location is the first consideration, as determining the possibilities of good drainage. Do not build a barn in a hollow, with rising ground all around it; for this would expose your stock to miasmatic fevers and other derangements of the general organism. In such a location, the simplest attacks of disease would be likely to take on a serious type, with greatly increased uncertainty in the action of remedial agents. Build a stable on an elevation, if possible. Have ground around it, at least on one side, that slopes away, so as to furnish good natural drainage, or free escape for superfluous water.

The next point after settling that of location, is the artificial drainage. There should be one large drain, to act as the discharge, with several

smaller ones extending in every direction, to act as feeders thereto ; also, outlets to the several parts and corners of the stable. See that there is descent enough to have a rapid flow of the sewage.

The next point to be attended to is to build the shell or walls so as to secure light enough. Right here is the chief defect in most city stables. Nothing is so weakening to the eyes as to be kept continuously in a dark place. When a horse thus stabled goes out into the glaring sunshine, the eyes cannot immediately adapt themselves to the new order of things, and see objects dimly, uncertainly, and with a squint, and hence he is apt to shy and otherwise misbehave. But this is not the only injurious consequence. It is a frequent cause of congestion of some of the inner sensitive parts of the eye, leading on to inflammation, and perhaps to blindness. If a small window is made at the head of each horse, it should be placed at least two feet above his head, so as not to have the light shining directly into his eyes ; but the best arrangement is to have the whole place lighted with a diffused light.

Next, as to the stalls. Let the plan always include one or more box stalls, in which to place a sick or lame horse, as it is downright cruelty to confine a sick horse. Have the box stall so constructed that it can be

darkened at will, as without this you could not properly care for a horse suffering with eye disease. Let the box stalls have a level floor, as it is not only fatiguing but absolutely injurious to the joints of the feet and legs to stand on a sloping floor. The boxes should not be less than ten feet square.

The common stalls should be from four to five feet wide, remembering that five is preferable to four ; for horses are apt to get cast in narrow stalls, and, besides, they have less comfort when lying down. The floor of the stalls should slope a little, just enough to have the urine drain off, that is, from one to two inches, one inch being preferable. There is nothing more injurious to the tendons, legs and feet than floors built, as many are,

POINTS OF THE LEG.
Showing the location of synovial membranes and joint oil.



INJURED TENDONS.

The result of sloping floors.

to slope from five to eight inches.

Four cuts are here given, showing the anatomy of the parts that sustain injury in this way, and the results commonly seen following such injuries. The center of gravity is thrown in a different line from what nature intended; and though the feet and legs can stand this for a while, yet when long continued, the tendons become wearied, from the constant strain, and are also predisposed to sprains when the horse is taken out. The joints, too, share in the protest against the slope. The weight being thrown upon a bearing that is unnatural, the cartilages and ends of the bones become irritated, and the synovial bursæ distended; inflammation is set up; and then follows ringbone, spavin, osteophytes, or the like trouble, according to the special susceptibility of the animal.

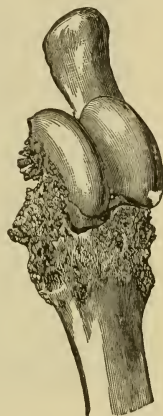
Any one may satisfy himself as to the correctness of these views, by noticing how a horse will back out of his stall, and stand with his toes in the gutter, back of him. What is this for? To rest the back tendons that have been under an unnatural strain. Horses, when left to choose for themselves, will almost invariably find a place where the hind feet stand higher than the fore. This is well illustrated by the cut at the end of chapter IV, Part II.



OSTEOPHYTES ON THE PASTER-
N BONES.

higher than the main floor. This is a great mistake, notwithstanding it may save labor to the stable-man, for his comfort and ease should never be allowed to outweigh those of the stock.

Very serious accidents sometimes happen from the horse kicking over the rear post of the stall, and coming down astraddle of it, in some instances letting the intestines right out on the floor, and in others skinning the whole inside of the leg, from the thigh to the foot, clean to the bone. To prevent this, let the rear post go from floor to ceiling, and see that it



DISEASED HOCK
JOINT.

Another danger from sloping floors. Hock joint of the left hind leg, in which the bony deposit of spavin has involved all but the true hock joint.

is securely fastened there. Build the insides of the stalls of hard wood planks, to the height of four feet, and top them out three feet more with strong wire-work, which is decidedly preferable to a solid partition between the stalls, as it affords their inmates the comfort of one another's society. Horses, like human beings, get lonesome when isolated, and pine for company; besides this, solitude has a tendency to engender viciousness.

Ventilation is a very important matter, as every one will admit who has gone into a badly ventilated stable in the morning, and noticed how



THE LAZY MAN'S WAY OF CLEANING THE LEGS.

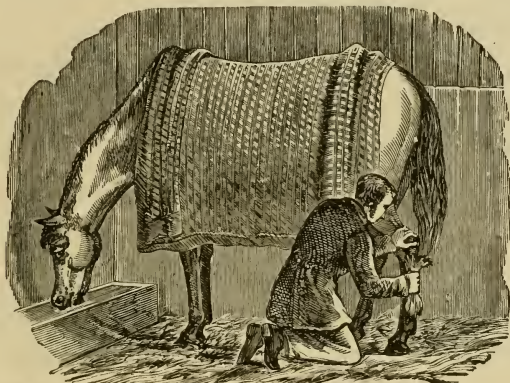
Easy and convenient, but very injurious.

it affects his eyes, his breathing, etc. Large tubes should be placed along through the stable, from thirty to forty feet apart. They should be from two to four feet square, and run out through the roof, with slats at the top or sides for water-sheds; below, they should come just through the ceiling into the stable. Then, every twenty feet, there should be tubes, four or five inches square, entering at the floor, through the walls, from the outside, and carried up along the wall inside as high as eight feet. The air thus admitted, making a curve at the top of the tube, will descend to the floor, but becoming tempered before it strikes the horses, and will force up the warm, vitiated air through the large tubes and out through

the roof. As to doors, have enough to keep the stable cool in summer, but avoid a draft, especially when the horses come in warm and tired, as they are then especially susceptible to colds, and attacks of throat and lung diseases, etc.

III. Feeding and Watering Stock.

This is a matter that interests every stock owner, and one also in which there is a great amount of abuse. We seldom find a duplicate of the notorious bad-debt collector, Cottle, of Chicago, who deliberately starved his horse to death, but we often find men who abuse their stock through ignorance. For instance, there are not a few who water their horses only twice a day. This is a real abuse, for not only does the animal get terribly thirsty, but, as a consequence of his intense craving for water, he will, when he at last gets at it, drink a great deal more than is good for



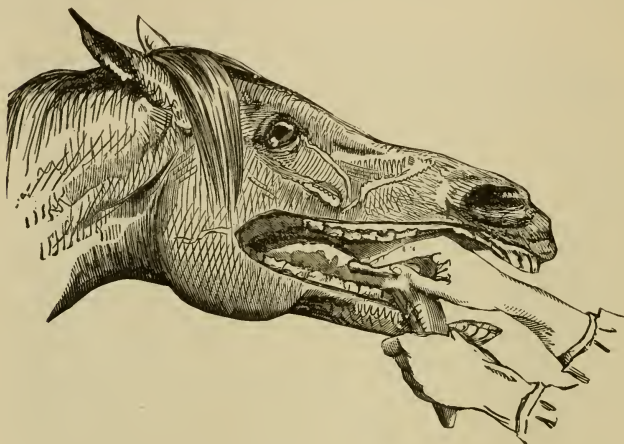
THE PROPER WAY.

How to dry and clean the legs in cold weather.

him. The stomach of a horse holds only about three gallons, but in these cases he will sometimes drink three or four pailfulls, making from nine to twelve gallons. If this follows soon after eating, it washes the food right through the stomach into the intestines, before it is digested, giving rise to colic, with all its attendant dangers. The water given stock should always be clean, not from a foul well in the barn-yard, and should be allowed three or four times a day, preferably four; or, better still, let it run before them all the time, being careful not to let them over-drink when coming in warm from work.

The food should be clean, sound, dry, healthy grain and hay, and well harvested, free from smut. It is a great saving to the pocket of the

owner, as well as to the stomach of the horse, to grind all grain and cut the hay; and it is an unquestionable advantage to the animal to have the grain partly cooked, by steaming. This can be effected, without much trouble, by pouring hot water on it, covering, and then letting it steam and swell. This will render the grain more digestible, and less liable to ferment and cause flatulent colic; more of it will be digested, also, because the cooking will make digestible a considerable proportion of the food



THE OLD WAY OF GIVING A BALL.

In which the operator is liable to get his hand scratched or bitten, and the horse's tongue may be torn.

that in its natural state is not so; hence the economy. Stock of all kinds should be fed three times a day—less at a time if necessary, but never at greater intervals.

The quantity of food must always be gauged by the size of the animal and amount of work exacted. Work horses accustomed to large feeds of strong grain should have it reduced when idle, even for the short time extending over Sunday. They should get simply a bran mash or a mess of carrots on Saturday night, and the other feeds should be reduced nearly one half on Sunday; then they will come out in fine condition on Monday morning. But if the usual quantity of strong, heating grain is allowed, the horse is very apt to come out Monday morning with a big elephant leg—lymphangitis, or else, though going out apparently all right, is soon attacked with congestion of the kidneys or other internal organs.

IV. The Care of Stock when in Stable.

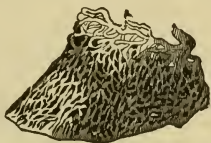
The object of this section is more to correct abuses in the use of cold water and want of exercise than to give elaborate rules in regard to grooming, etc. Cold water is a good thing, but, like all good things, is apt to be abused. In our northern latitudes it is too cold to allow the free use of cold water in cleaning the horse's legs and feet, from November 1st to April 1st, or even a longer period; for cold water thus used on the extremities already chilled, is very apt—nay, almost certain—to cause scratches, grease, furruncle, or the like. If warm water is used and the legs thoroughly dried, no damage is done, but it is not once in a hundred times that they are thus properly dried. The best way is to clean and dry the legs and feet with a whisk of hay or straw, or with a rubbing cloth when the horse comes in; then, when thoroughly dry, clean them properly with a brush. This, in most instances, will keep the legs free from scratches.

Horses should not be kept any considerable length of time on a board floor without exercise and occasional removal of the shoes, the same as though he were at work; for the feet will get dry and brittle, contract and



SCRATCHES.

As seen in the hollow of the pastern.



SHOWING THE VEINS OF THE FOOT.

Which may be seriously interfered with by contraction of the hoof from standing too long on a board floor without attention to the moisture, shoeing, etc., of the feet.



EXOSTOSIS OF THE COFFIN BONE.

As sometimes seen in complications of navicular disease, contraction, side bones, etc.

press upon the quarters, causing corns, and perhaps setting up inflammation that may form side bones, contract the tendons, etc. If obliged to keep a horse standing idle in a stable, have his shoes taken off, and, if possible, let him have a dirt floor to stand on, sprinkling occasionally to dampen it. A box stall would be much the best for him.

V. Additional Directions for Giving Medicines.

It is very necessary for the stable-man to be able to give medicine, both in the form of drenches and balls. Many a dose of medicine, of the

utmost value to the horse, is lost through not knowing how to administer it properly. Small doses of liquids are best given with a syringe. Stand in front of the patient, fill the syringe, (one that can be worked with one hand is absolutely necessary), open the mouth by inserting the left hand through the mouth, and holding the fingers up on edge; pass the syringe between the fingers, and shoot away; withdraw the syringe, and elevate the head a trifle with the left hand. So continue till the dose is all down. When properly done, not a drop is wasted and the horse is not excited; nor (which is quite a point) does the man get angry, and whack the horse over the head with the bottle. With large doses, however, the bottle must be resorted to. Pass a loop in the mouth so as to catch the upper jaw, then raise the head by running a line over a pulley, or by inserting a long crotch or fork in the loop and having an assistant lift at it; the operator, meanwhile standing at the right side of the horse's head, steadies the head with one hand, and pours down the contents of the bottle with the other. Pour very slowly, and never resort to any violence to make the patient swallow; just give him his time. If he coughs, strangles or chokes, let down his head instantly, regardless of the loss of the medicine. (See last cut in Chapter I, Part II.)

Solid medicine it is best to give in the form of a ball. Make up the ball with syrup, soft soap or linseed meal, its size that of your big finger, and wrap it in soft paper; stand in front of the horse, catch firm hold of the tongue with the left hand, and draw it down between the incisor teeth, never at one side; take the ball between the fingers, the thumb being drawn into the palm of the hand; then pass it back, placing it on the root of the tongue, let go of it, and give it another push with one finger; withdraw the hand, let go the tongue, close the mouth, elevate the head a trifle, and watch on the left side of the neck for it to go down. Remember, in giving medicine of all kinds, never abuse or excite the patient, but take him as quietly as possible.



THE PROPER WAY TO GIVE A BALL.

For the benefit of young farmers and others of limited experience, we would say that good sense and self-possession are the secrets of success in treating sick stock. These will greatly aid you to see clearly what ought to be done, and to use to the best advantage such means as you have at hand for doing it.

There are cases in which medicine and food have to be administered in some other than the ordinary way; as, for instance, to a horse with tetanus, that cannot open its mouth. In this case, the medicine and

liquid food can be given through a tube passed through one of the nostrils and down into the throat, or they may be given by the rectum; but in the latter case large quantities will be necessary, as a portion will not be absorbed.

VI. Detection of Disease.

It is of the greatest importance that every stableman should have a quick eye for the early symptoms of disease in his stock. Ignorance of these symptoms allows the case to run on into a more advanced stage, when its treatment requires more skill, and more medicine, all entailing more expense in order to save it, and, of course, with much less chance of doing so after all. "A stitch in time saves nine;" and no one will dispute the fact that it pays to spend ten dollars to save a hundred. If it pays to treat an animal at all, it pays to begin doing it early. One day's neglect of a sick horse may cost his life. When, therefore, a horse stands back in his stall, hangs his head, drops his ears, refuses his feed, declines to move, partly closes his eyes, has the nostrils slightly dilated from increased frequency of respiration, or has the ears and extremities cool or cold,—when any of these indications are noted, it is safe to conclude that the



FEEDING A HORSE WITH TETANUS.



A SICK HORSE.

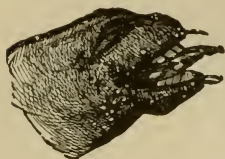
Appearances about the head that indicate a sick horse.

horse is sick, and something should be done immediately. If near a qualified veterinary surgeon, employ him; otherwise, endeavor to find out for yourself, and at once, what is the matter. Note the symptoms carefully, taking the pulse, respirations and temperature, and examining all parts; then, when the disease is diagnosed, proceed with the treatment vigorously. There are many simple ailments that any intelligent man can cope with successfully.

Get at the bottom of the trouble, remove the cause, apply the treatment, and, in most cases, you can cure the animal. Take, for instance a case of aphtha, which is a simple irritation of the mouth, tongue and lips, sometimes extending up to the cheeks, both inside and out.

Aphtha is much the oftenest seen in foals, resulting from the irritation to the membranes of the cheeks that follows too much sucking. When

seen in older horses, its most common cause is the irritating effects of the dew and frosted grass in spring and fall. The lips, tongue, etc., will be found to be slightly swollen, and covered with a pimply eruption resembling blisters; in fact, the parts affected look as though blisters had actually been applied.



APHTHA.

The treatment, in the case of a foal, is simply to separate him from the dam for a few hours; let him suckle, and then promptly separate them again, and so on till he is well. Older horses should be taken up nights, and not let out in the morning till about nine o'clock. Swab out the mouth and affected parts with recipe No. 46.

This is all very simple, and nothing at all but what any stock man could do, if he would give the case proper thought and attention.

VII. Charbon or Anthrax in Horses.

This disease pertains to the horse as it does to all warm-blooded animals. Curative treatment is useless. Preventive treatment lies in vaccinating horses the same as cattle in infected regions. The regions that are mostly infected, and require vaccination regularly, are the low-land sections of Louisiana and Mississippi. There are many plantations down there that require vaccination once a year to save horses and mules from dying with Anthrax. The vaccine can be purchased from any of the dealers in biological products, with directions how to use.

The symptoms and post mortem appearances are the same in horses as in cattle and hogs.

For fuller description, causes, prevention, etc., see Department on Cattle, pages 821, 822, 823, 824 and 825. The facts there given apply to the disease wherever it may exist and in whatever class of animal it develops.

CHAPTER XXV.

OPERATIONS.

I. ANÆSTHETICS, AND HOW TO USE THEM.—**II. BANDAGES.**—**III. BLEEDING.**—**IV. BLISTERING.**—**V. CASTING.**—**VI. CASTRATION.**—**VII. EXTIRPATION OF THE EYE.**—**VIII. FIRING.**—**IX. LITHOTOMY.**—**X. LITHOTRITY.**—**XI. NEUROTOMY.**—**XII. NICKING AND DOCKING.**—**XIII. OPENING AN ABSCESS.**—**XIV. TAPPING THE CHEST, AND TAPPING THE ABDOMEN.**—**XV. PRICKING.**—**XVI. PROBING AND OPENING A FISTULA.**—**XVII. SPAYING.**—**XVIII. SUTURES.**—**XIX. TAPPING THE BELLY FOR FLATULENCE.**—**XX. TENOTOMY.**—**XXI. TRACHEOTOMY.**

In this chapter we shall describe all of the more common surgical operations on the horse. Some of these can be performed by any intelligent person, who will exercise a reasonable amount of care and prudence, with ready reserve resource to fall back on in case of accident. The latter, in fact, is a very necessary qualification in any operator; for accidents may happen, and result disastrously, in the most skillful hands. At the same time, many valuable expedients may be resorted to, in cases of this kind, which it is absolutely impossible to prescribe by set rules beforehand. Here, quick-witted common sense must be the main reliance of all practitioners alike.

J. Anæsthetics, and How to Use Them.

Anæsthetics are drugs or agents that destroy feeling. They take away all sensation, and all power of voluntary action; and they sometimes cause death, by suffocation, or suspension of the involuntary actions of the body, if they are given too fast, or their use is carried too far. Hence, they should never be administered by inexperienced or unskillful hands. The principal agents of this class employed in veterinary practice are chloroform and sulphuric ether; chloral hydrate is often used as an anodyne, but not as an anæsthetic.

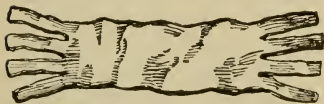
The animal is usually cast, legs tied, and, when everything has been prepared for the operation, a large sponge, saturated with chloroform or ether, is held to the nose, being re-wet every little while, as long as may be necessary. The nose is sometimes enclosed in a bag, so as to confine the fumes, but it is better not to do this. The risk thus run vastly outweighs the few advantages it offers. If sufficient air is mixed with the anæsthetic, there is no danger, but horses usually struggle very severely during the exciting stage,—just before they go under its influence, and, on that account the method mentioned is not considered safe by many of the best authorities.

II. Bandages.

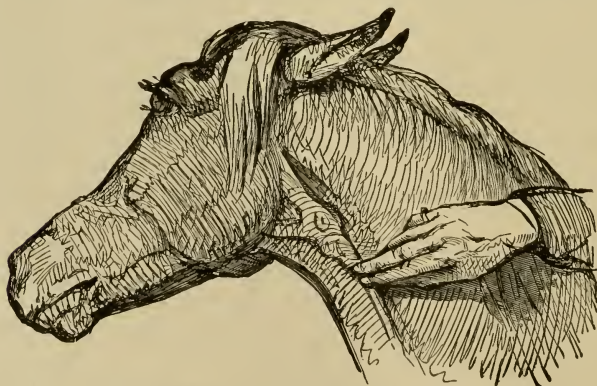
These are very important adjuncts to the treatment of lameness, when in the legs, and, also, in stopping a hemorrhage and dressing wounds. They should be applied smoothly, and with moderate pressure. For lameness and dressing wounds, coarse unbleached muslin is the best. For binding on a sponge or other substance, to stop bleeding, the many-tailed bandage is very convenient. For moderate pressure, as in case of windgalls and stocked legs, the Derby bandage is very useful. Elastic bandages are good when considerable tension is desired, but they need careful application, to avoid abrading the skin.

III. Bleeding.

Bleeding is an old time practice that has almost become obsolete, on several accounts, of which the principal seems to be that the congestion and pulse can be controlled by other means less depleting and weakening, thus giving the animal a better chance to recover by husbanding his strength. Then, again, the seasons and atmosphere have so changed that diseases, especially of the lower animals, are more likely to become epizootic, with typhoid symptoms and great nervous prostration, when it is utterly unsafe to bleed. Still, bleeding is valuable in cases of congestion; when there is a full, strong pulse and no



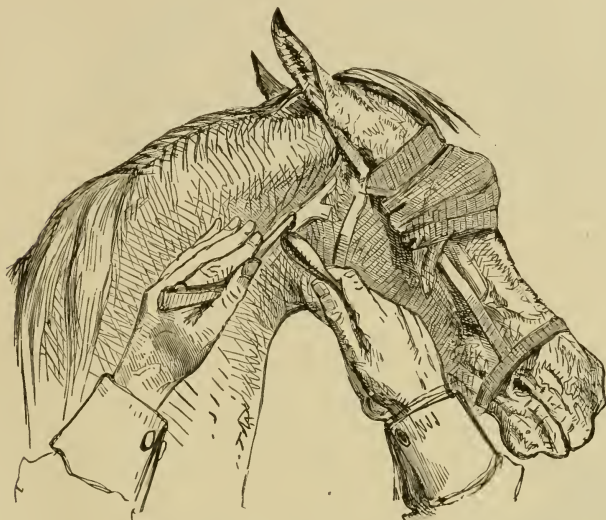
MANY-TAILED BANDAGE.



RAISING THE VEIN BEFORE BLEEDING.
(The Place to Cut—an Old Time Practice.)

weakness, but only in the first stage—never when the temperature of the patient is abnormally high and the system has become weakened.

The finger is pressed on the vein, to make it fill ; or a cord may be tied sufficiently tight around the neck. Then place the blade of the fleam on the vein, at the point indicated in the illustration, and strike it a good smart blow with a round stick. commonly called the blood-stick ; have a bucket in readiness, and catch the blood in it, to know how much you draw. Draw from two to six quarts, according to age and size, and the conditions of the case. It is a good plan to blindfold the horse to avoid his



STRIKING THE FLEAM WITH THE BLOOD-STICK.

(An old time practice now almost obsolete.)

jumping away from the blow of the blood-stick. When sufficient blood has been drawn, remove the cord or other obstruction, when the flow will stop. Insert a pin and weave a hair or silk thread around the pin in such way as to describe a figure 8. Leave it in for a few days, when it can safely be removed.

IV. Blistering.

When a severe blister is desired, the hair should first be clipped off very close or shaven. Apply the blister a little at a time, and rub it well in, with sufficient friction to get up considerable heat between the hand and the skin ; then, when sufficient is rubbed in, smear some over the surface, and tie the horse up sufficiently short to prevent his getting his mouth

to it, or he will bite and blemish the sore and blister his lips. Keep him thus tied ~~up~~ from twelve to twenty-four hours, smearing fresh lard over



CATCHING THE BLOOD.
(An Obsolete Practice except in Rare Cases.)

it at the end of ten hours, to relieve the pain by keeping the air from it, which it will do without interfering with the blister. After about two days, begin washing it with warm water and a very little soap. Soften off the scabs, and clean the skin around the blister; and when dry, apply the grease. Repeat this once, daily. If the scabs are not softened off when pus collects under them, the pus burrows, and if not liberated, is apt to blemish.



A HOCK WHEN BLISTERED.

In mild sweat-blisters, it is not necessary to clip off the hair. Simply rub the blister in gently once a day, till sore enough, then grease once a day till nearly healed. Repeat this as often as necessary.

Ointments are preferable to liquid blisters as being more manageable, and because they can be kept where wished, while liquid blisters are apt to run.

V. Casting.

There are many ways of casting a horse, all having some merit. The chief point to be remembered is to throw him carefully, as broken back, broken hips, etc., are among the dangers that attend carelessness. The

most convenient way is to put hobbles on the feet, and run a chain through the D's, and draw the feet all together, having a rope running from one arm over the back, to make him fall on the side desired; also, a good man at the horse's head to prevent his throwing it around and falling on it, and thus breaking his neck. Always put down a good bed beforehand, for him to fall on.

Rarey's plan of casting is good, in the absence of hobbles, viz: Tie up one fore leg; then tie a strap to the pastern of the other fore leg, and pass it over the horse's back; standing at the shoulder, push him over a step, at the same instant pulling up the foot and bringing him to his knees. He will do some rearing and jumping about, but when he gets tired, he will lie quietly down, when his legs can be tied and held down. To prevent him from pounding his head, it is necessary to place a good man there, who should put one knee on his neck and turn his nose up at an angle of forty-five degrees. As a safeguard against too severe straining, tie a rope from just above one knee to above the hock of the leg on the same side, and draw the legs as close together as possible, and confine them there. This lessens his power to struggle.

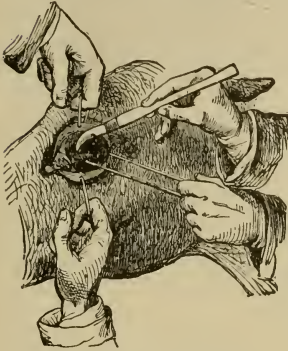
VI. Castration.

The best age for castrating colts is from one to three years, the exact time to be determined by the development of the neck and fore parts. If these are heavy, castrate early; if light, he will thicken up and grow heavier, by being left entire another year. Prepare him by giving soft food for a week previous, and nothing at all for about twelve hours before the operation. Cast him, and roll him up on his back; tie the hind feet down to a surcingle; take the scrotum in the left hand, and draw it over one of the testicles so as to bring the dividing line between the two sides over it; next draw a small superficial slit about half an inch from the line, (one on each side of it,) thus marking the proper place to make the incision; then cut one slit through to the testicle, letting it out; slit open the inner coverings, one by one, till the testicle pops out clean from all the coverings; (avoid wounding the testicle with the knife, as this would cause profuse bleeding, and interfere with the work;) then separate the tunics from the small end, and let them drop down over the cord; put on the steel clamps, to hold the cord while the ecraseur is being applied; put the ecraseur on as low as possible, and with it bite off the cord, still holding on to the latter with the clamps. Let go the cord, and operate on the other testicle. Rinse out the sack with cold water, and let him up. The emasculator, a modern instrument, is becoming very popular; it being handier and safer, less likely to be followed by hemorrhage, than the ecraseur.

The old way of castrating with clamps is convenient, but it gives rise to an immense amount of pain, and is a quite inferior method compared with using the ecraseur.

VII. Extirpation of the Eye.

In cancerous growths in the eye, it is sometimes necessary to extirpate that organ. After casting the horse, pass silk threads through the lids, so that an assistant can hold them open; then, with a sharp knife, dissect the eyeball out, cutting the muscles as they come, one after another, and, finally, the optic nerve. Dress the socket with lotion No. 39, for a few days; then change to lotion No. 7. As this is a very painful operation, an anæsthetic should always be used, if a skillful man can be got to manage the case.



EXTIRPATION OF THE EYE.

VIII. Firing.

This is the application of the actual cautery (burning by red-hot iron) to set up a great amount of counter-irritation or of adhesive inflammation. Its most common applications are for ring-bones, curbs, and sprains of the back, tendons, etc. Clip off the hair, cast the horse, and draw the edges (which should be blunt) of the firing-iron on the skin, making a yellow crease on it, but avoid cutting through the skin, as that would blemish more. Draw the lines, in the form of a feather, over a considerable surface; let the horse up, and rub in the blister immediately. Give absolute rest for a month, and a run at grass for two months.

IX. Lithotomy.

This is an operation to extract a stone from the bladder. Cast the horse, and insert a metallic sound into the penis to reach up to the curve; cut down to it on the curve, then insert a hidden bistoury, and open the passage into the bladder, making it large enough to allow of the stone being got out. Insert forceps with one hand, the other hand being in the rectum and following up the stone and crowding it out. If too large to extract whole, try and break it up with the forceps.

If the patient is a mare, it will not be necessary to cast the animal. She can be controlled sufficiently by using a twitch, which is a loop of strong, small rope, on the end of a small stick, for twisting the upper

lip as shown by the cut in Section XIV of this chapter. Insert the bistoury *cache* into the bladder, the opening to which will be found on the floor of the vagina, about three to six inches from the external orifice ; open the neck of the bladder, and then, with one hand in the rectum, the stone can be drawn.

In either case above described, dress the wounds with lotion No. 39, twice a day. The wound in the skin of the horse can be sewed up. When dressing the wound, rinse out the bladder with tepid water.

X. Lithotritry.

This is the name given to the process (mentioned in the last section) of breaking the stone into small pieces with forceps, and taking it away a little at a time. It is sometimes so large as to make it absolutely necessary to do this, or, in some cases, even to saw it in two.

XI. Neurotomy.

This is an operation to destroy sensation in the foot, in some cases of chronic, incurable lameness. Cast the horse, and, after clipping off the hair over the spot to be operated on, cut in through the skin to the nerve three or four inches above the fetlock, just back of the cannon, where it will be found running in the same sheath with the artery and vein. The last two, however, are deeper seated and together, the nerve running on the top of them. Make the incision half or three quarters of an inch long, lengthwise of the leg ; dissect away the cellular tissue ; raise the nerve, and pass a thread of silk around it, and tie a knot ; (if it is the nerve that is tied, the horse will struggle violently from the pain, but if, from accident or mistake, the artery or vein has been taken up instead, there will be no pain, and consequently no struggle) ; sever the nerve above the silk with a sharp knife ; then, cutting below the silk, take out a section of the nerve about three quarters of an inch long. Take a stitch in the skin, and dress with Friar's balsam three times a day.

The foregoing is known as the high operation. If the lower operation is preferred, the incision is made about midway down the long pastern bone, on either side of it. The former is usually considered the better one, as it takes away the sensation from the entire foot, while the lower only takes it away from the heels ; there are filaments from the anterior branch of the nerve, extending down to the heels, which destroy the desired effect, to a great extent.

Neurotomy should never be performed except as a last resort ; for it does not cure the disease, but only destroys the feeling in the part, so that there is no more pain in it. Although the horse hangs the foot down as though it were sound, it is only a question of time for it to go

all to pieces, either from the tendon giving way, or else by suppuration from a nail wound or corn, extending all around the foot. After neurotomy, it is necessary to be doubly careful in shoeing and taking care of the feet, to avoid the pricks of nails, corns, etc., and, should these occur, to treat them at once, lest bad complications ensue. Some horses work well for four or five years after neurotomy, and some go to pieces in a few months.

XII. Nicking and Docking.

Nicking and pricking are identical in effect, viz: to straighten crooked tails. When a horse hugs his tail, it is sometimes necessary to sever the depressor muscles on the under side, and suspend the tail over a pulley, for two or three weeks. Insert the knife about two inches from the dock, on the under side at one side of the tail; pass it in across the tail to within a quarter of an inch of the center, to avoid the large artery running down the under side in the middle, holding it flatwise—on its side; then turn up the edge towards the bone, and, with a sawing motion, sever the muscle clear to the bone. Withdraw the knife, leaving only the small wound through which the knife entered. Tie the tail to a rope running over two pulleys; the tail being tied to a loop of it running down from each pulley, the ends passing over them should reach to the floor, with a weight attached to each end, so as to allow him to lie down. Keep the tail suspended in this way from two to three weeks.

In case the tail is crooked or twisted to one side, insert the knife in a perpendicular position from below upwards, just under the skin; turn the edge towards the tail, and saw through the muscle; then tie the tail around to the opposite side for a couple of weeks. It is often necessary to cut in two or three places. If the cuts suppurate, dress them with lotion No. 39. If the first operation fails, try it again.

Docking is amputating a portion of the tail, bone and all, to pander to the taste or whim of the owner. It is best done with a pair of docking shears made for the purpose. It is usually taken off from eight to ten inches from the beginning of the long hair at the dock. Part the hair evenly all the way round; fold that of the upper portion upward and tie a strong cord tightly around the tail, including the hair, two inches above the part. Hold the tail straight out and cut it off at the part. Scar the end with a red-hot iron to prevent hemorrhage; then put a bunch of oakum, the size of a fist, onto the end, pull the hair down over it, after removing the cord, tie it around the hair tightly below the oakum. Begin next day to apply lotion No. 5, several times a day for ten days, then apply No. 7. If the horse carried a good tail before docking, a week will be long enough to leave him in the pulleys, and he can be put to work; but if he carried a poor tail, keep it suspended two or three weeks. Oftentimes it is neces-

sary, in such a case, to nick the depressor muscles and keep him in pulleys two or three weeks before docking him. If the knife is clean, there will be no suppuration.

XIII. Opening an Abscess.

This is a simple matter, when done properly. If improperly done, it is of little use, and the cure is apt to be retarded. When an abscess is ripe and ready to open, ascertain, as near as possible, where the bottom of it is, and insert the knife at that point, making an opening quite to the bottom for the escape of the pus. If this is impracticable, and the opening must be made at the top, the pus must be evacuated by means of a syringe or sponge, to draw it out. The main point to be remembered is to open it as near to the bottom as possible. A twitch on the nose is usually sufficient to keep the animal quiet in this and other minor operations.

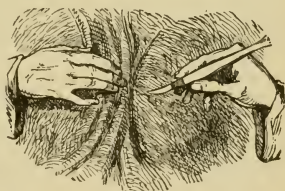


OPENING THE ABSCESS OF STRANGLES.
Also illustrating the twitch and manner of using it.

XIV. Tapping the Chest and Tapping the Abdomen.

The chest fills with water in hydrothorax; it is the stage of effusion in pleurisy. The lungs are floated up, and suffocation results. The presence of water in the chest is detected by the solid sound—a sound of fullness—when tapped with the hand, and by the absence of respiratory murmur; and, frequently, the splashing of the water by the action of the heart can also be heard.

Clip off the hair from a spot about three inches back of the elbow, and five or six inches from the bottom of the chest. Ascertain the exact location where a puncture can be made without striking a rib (the trocar to pass between two ribs); then plunge a scalpel deep into the flesh, making a hole through the skin and flesh for the trocar; insert the latter instrument and withdraw the trocar, leaving the cannula to act as a spout; hold a pail and catch the water. If pieces of lymph clog the cannula, pass in a small probe and push them off



OPENING OF THE SKIN,
Preparatory to tapping the chest.

the end. Drain off all the water and withdraw the cannula. It is often necessary to repeat this operation.

This operation is technically termed *paracentesis thoracis*. Cases so severe as to require it are usually fatal.

Paracentesis abdomenis means, in plain English, tapping the belly. In peritonitis, the belly often fills with water, which can be evacuated by inserting the trocar and cannula on the median line, a couple of inches back of the navel. The operation may be repeated, if necessary; but, in this case, it is advisable to make a fresh hole, rather than insert again in the old one.



WATER FLOWING
FROM THE CHEST.
In *paracentesis thoracis*.

XV. Pricking.

This is identical with nicking, (which see).

XVI. Probing and Opening Fistulas.

It is necessary to probe fistulous openings, in order to know where they go. Take plenty of time, and do it carefully. Find every sinus, if possible. When practicable, the best and quickest way to cure them is to open them right up along their whole length; but when this cannot be done without severing large blood-vessels or too much muscular fibre, pass a seton through them and draw in caustic substances, such as burnt alum, powdered blue-stone, etc. Or, instead, use injections Nos. 1, 3 and 5, changing from one to another frequently.

XVII. Spaying.

This operation is very rarely performed upon the mare—never, in fact, except in case of disease. There is great danger of its proving fatal, and hence it should never be undertaken except by a skilled veterinarian. It consists in removing the ovaries, corresponding to the castration of the male.

XVIII. Sutures.

There are four kinds of sutures, viz: the interrupted, uninterrupted, quilled and twisted. The interrupted suture is the one generally used, and for most cases is the best. The needle and silk—or, instead of the silk, the silver wire or catgut—are all that are needed. Clip off the hair from the edges, and be careful to have everything clean. Draw the edges of

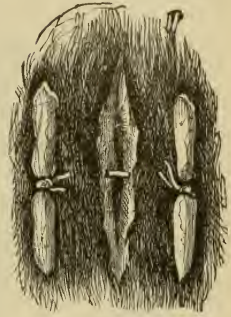


UNINTERRUPTED SUTURE.

the wound together with a slightly curved needle and silk, and when tying the knot give the ends an extra turn through the knot, which will

keep it from drawing away and untying; then go on and make a hard knot on the top of the other, and cut off the silk. Then take another, and so on.

The continuous or uninterrupted suture sews up the wound by continuing the stitches right along, the same as in sewing cloth, and tying the ends. The quilled suture is when two quills or pieces of wood are used as skewers, and the ends of the silk caught over them, the skewers being placed one on each side of the wound, to prevent the stitches from tearing out. The twisted suture is simply a pin inserted and a hair or silk thread wound around its ends in the form of a figure eight, as already described in the article on bleeding. In most cases, the stitches ought to be taken about half an inch apart.



QUILLED SUTURE.

XIX. Tapping the Belly for Flatulence.

It is usually either some of the large intestines or the stomach that is affected with flatulence. The former are tapped by inserting the trocar and cannula in the center of a triangle drawn from the point of the hip, the ends of the transverse processes of the lumbar vertebrae and the last rib. Clip off the hair from a spot half an inch in diameter, brush the scurf from the skin and make a puncture through the skin with a knife, then pass in the trocar and cannula, directing it inward, downward and forward; withdraw the trocar and leave the cannula to carry off the gas. After the gas has escaped replace the trocar into the cannula before withdrawing it. Wet this wound several times a day with lotion No. 5 for three or four days. This operation may be repeated, if necessary, and on either side of the horse. The trocar for this purpose should be six inches long and one-quarter inch in diameter.

XX. Tenotomy.

When the tendons become very much contracted and cannot be relaxed, they can be severed, when the ends will extend, grow together again, and thus repair the excision. This operation, called tenotomy, is most commonly practiced on the tendon of the leg, and about midway between the knee and fetlock. Insert the knife across the tendons, with the blade on its side; let it go just to the skin on the other side, but not through it; then turn the edge towards the outer part of the leg and saw away, taking care not to cut the skin at the back of the leg. When the tendons are severed, break up the adhesions by bending the leg across your knee. Dress the wound in the skin, treating as a simple wound.

XXI. Tracheotomy.

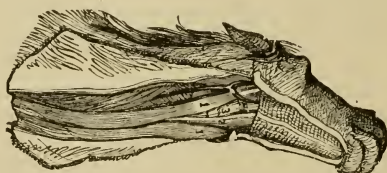
This consists of the insertion of a tube into the trachea or windpipe, to prevent death from threatened suffocation. The tube ought to be of



PERFORMING TRACHEOTOMY.

silver, but in the absence of that, one made of tin will, in the writer's opinion, answer every purpose; it should be three-quarters of an inch or an inch in diameter, curved so as to slip into the windpipe easily, with a plate of the same material on the end to tie to the neck, in order to keep it in place. Open the skin by an incision about two inches long, at a point eight inches below the throat; divide the muscles, and lay bare the wind-

pipe; cut out a piece of two rings, making a hole large enough to admit the tube. Take the tube out and clean it with carbolic lotion No. 39, once a day, and replace it as soon as possible. When the cause of suffocation is removed, the tube may be taken out for good. The hole will soon fill up and heal. Instead of using a round tube and cutting out a section of two rings, it is preferable to use an oval tube and pass it in between two rings. This does away with the danger of a cartilaginous tumor growing from the cut rings of the trachea. Such a tumor sometimes follows the cutting of the rings, and obstructs the breathing, rendering the horse useless.



THE STRUCTURES MET WITH IN THE OPERATION OF TRACHEOTOMY.

1. The sterno maxilaris muscles, (a pair) which have to be separated, being joined by cellular tissue.
2. The sterno thyro hyoidei muscles lying under those above mentioned. These also have to be separated, being similarly united.
3. The trachea, which will be fully exposed when the muscles are separated and pulled back.

CHAPTER XXVI.

CONCERNING THE VETERINARIAN'S CERTIFICATE OF SOUNDNESS.

- I. EXAMINATIONS IN THIS COUNTRY AND IN EUROPE.—II. WHAT THE VETERINARIAN SHOULD SEE TO, FOR HIS CLIENT.—III. CONDITIONS MODIFYING THE CERTIFICATE.—IV. THE SELLER'S GUARANTEE SHOULD COVER VICES.

I. Examinations in this Country and in Europe.

Under what circumstances can a horse be returned to the seller, as unsound? This we propose to consider briefly, even though at the risk of a little repetition of directions given elsewhere. In Europe it is quite a common practice to have horses examined for soundness by experts, but in this country, where every man professes to be a horseman, there is much less of it done. Here, if a man gets bitten in making a trade, he usually says nothing, but contents himself with getting satisfaction out of the next one. Still, there are some examinations made for soundness even in this country, and it may be well to state what a veterinarian bases his decision upon, in giving a certificate.

II. What the Veterinarian should see to, for his Client.

The age, size, and general appearance of the animal should first be considered; also, his adaptability to the purposes in view. It is the veterinarian's duty to use his influence to prevent his client from buying a draft horse for his carriage, or *vice versa*; in fact, he should consult not only his client's needs, but his wishes and tastes as well, and should see that these are met as fully as possible.

In making the detailed examination, he should see that the mouth and tongue are all right, no poll evil, no running at the nose, no cough, fistulous withers, nor anything wrong with the head or shoulders. He should see that the fore legs are free from bony deposits, and the feet from corns, sidebones, contraction, etc.; that there are no ruptures on any part of the belly or serotum, no broken hips, nor broken tail. He should carefully note whether the hind legs are free from bony deposits, capped hocks, and spavins of all kinds, and make sure that there is no thickening of any of the tendons of either the fore or hind legs, nor yet any windgalls or curbs.

Next, move him for the detection of lameness—slow, fast, turning, backing, stopping and starting again; and also for the wind—whether thick or broken, and whether there is roaring, whistling, or wheezing.



ONE TEST FOR ROARING.

Then examine the eyes closely—first in the sunlight, next in a dark place, and then in the sun again—to detect any abnormal expansion or contraction of the pupil, and for opacity or cloudiness of the cornea, and clearness or otherwise of the humors of the eye.

III. Conditions Modifying the Certificate.

Any disease of any kind existing at the time—internal, skin or otherwise, is, strictly speaking, unsoundness. There are some conditions, however, which, though they are not absolutely sound, do no harm, and these should be mentioned with a view of qualifying the certificate. Under this head will come splints, when not near the knee; feet that show the previous existence of corns, but having none at present; and curbs, when old, as these, though objectionable, do not often hurt a horse for work, either fast or slow. The previous existence of fistulous withers, if entirely cured and sound at present, is not unsoundness; but marks of poll-evil would make an animal objectionable, as it indicates a tendency to rear and, perhaps, to fall backwards, throwing the head violently upwards, etc.

IV. The Seller's Guarantee should cover Vices.

The seller should guarantee a horse free from vice as well as sound, for vices cannot always be detected, even by the most critical examination. Under such a guarantee, a cribber; a windsucker; a kicker, either in the stall or harness; one that pulls back, and breaks the halter, and a shyer, are all returnable.

In case of any departure whatever from an absolutely healthy, natural condition, the surgeon, in justice to himself as well as his client, should state his opinion as to how much the defects noticed are likely to depreciate the value.

CHAPTER XXVII.

POISONS AND THEIR ANTIDOTES.

I. GENERAL RULES.—II. POISONING FROM DRUGS, MINERALS, ETC.—III. POISONING WHILE GRAZING—IV. POISONING OF THE SKIN.—V. POISONING FROM STINGS.—VI. THE LOCO-WEED DISEASE.

I. General Rules.

Horses are frequently poisoned, sometimes by eating noxious plants or by getting hold of poisonous substances left about the stable ; sometimes by malicious persons, from motives of revenge toward the owner, or to advance some personal interest ; and sometimes by overdoses of strong drugs. It is well, therefore, to know some of the more common poisons, with their modes of action and their antidotes ; and it is, of course, extremely desirable to be able to find and use suitable remedies with the least possible delay, since the loss of only a few minutes will, in some cases, cost the animal's life. A few general directions, like the following, it will pay the reader to commit to memory, and thus have them at instant command:—When the animal is poisoned by an alkali, give him an acid, such as vinegar, &c. For poisoning by an acid, give an alkali, such as bi-carbonate of soda (baking soda.) Both the articles here specified are nearly always on hand.

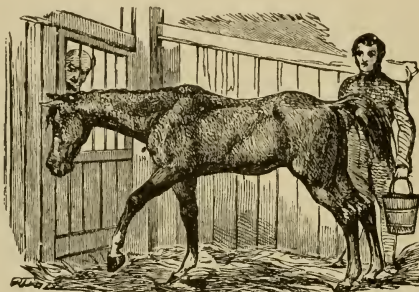
II. Poisoning from Drugs, Minerals, etc.

Aconite is frequently given in overdoses, causing profuse perspiration ; spasms of the glottis, seen in the continual swallowing when there is nothing to swallow ; congestion of the lungs, with difficult breathing ; gastro-enteritis (inflammation of the stomach and bowels) ; and quick pulse, gradually becoming imperceptible. Give strong coffee, in pint doses, every fifteen minutes till relieved.

Arsenic is sometimes got hold of. It is a corrosive, irritant poison, causing diarrhœa, mucous discharge from the eyes and nose, a quick, wiry pulse, and injected mucous membranes. Iron sesqui-oxide (iron rust) is the best chemical antidote. It is prepared by dissolving copperas and bi-carbonate of soda in water, separately, and mixing the two solutions, when the iron rust will fall to the bottom. Wash it with warm water, put in a bottle, and give three or four tablespoonfuls every ten or fifteen minutes. Being insoluble, it will have to be washed down the

animal's throat with plenty of water from the bottle. In the absence of this remedy give eggs, oils, milk, powdered charcoal, or blue clay.

Aloes in large doses is poisonous. It produces diarrhoea and superpurgation; dryness of the mouth; yawning and straining; quick, hard pulse, gradually becoming imperceptible; injected mucous membranes; and, sometimes, irritation of the kidneys. Give powdered ipecacuanha, in half drachm doses, every hour; starch gruel, internally, and enemas (cold) of the same, with one ounce of laudanum in each injection, repeating both gruel and enemas every hour; opium, in drachm doses, every four to six hours; chalk; port wine; and hot fomentations to the belly.



GASTRO-ENTERITIS.

Appearance of a horse suffering from inflammation of the stomach and bowels.

Ammonia, carbonate, is sometimes given in too large doses or not sufficiently diluted, when the mouth, throat and stomach become burned and blistered, and salivation follows. Give olive oil in doses of two or three tablespoonfuls, five or six times a day; also, milk and eggs.

Belladonna is a favorite remedy with some, and, when much used, is apt to be given carelessly and in too large doses, giving rise to dilatation of the pupils, narcotism (stupor), swelling of the head, and delirium. On post mortem examination, the blood will be found fluid; and decomposition sets in early. Apply mustard to the chest, and cold to the head; give milk and linseed oil—a pint of each, mixed,—and gentle exercise.

Bryony is often given with aconite. Over doses cause gastro-enteritis; liquid fæces; scanty, bloody urine; and a quick, almost imperceptible pulse. Give a pint each of milk and linseed oil, mixed, with an ounce of laudanum in it; starch gruel injections, with an ounce of laudanum in each one; and hot cloths to the loins.

Calomel is a corrosive, irritant poison, causing a discharge of black offensive fæces, diarrhoea, and great depression. Give opium, in drachm doses, three times a day; also use flaxseed tea.

Cantharides is a narcotic, irritant poison, causing gastro-enteritis, great irritation and inflammation of urino-genital organs, imperceptible pulse, and injected mucous membranes. Give a pint of linseed oil, which follow, after an hour, with large quantities of flaxseed tea or mucilage; apply hot cloths to the loins; give starch gruel and laudanum injections; and opium, in drachm doses, three or four times a day.

Chloroform is a narcotic poison. It causes a slow pulse; slow, heavy breathing; insensibility to pain; muscular twitchings; dilatation of the pupils; foaming at the mouth; and stupor. Throw cold water over the animal; raise and lower the fore legs continuously; pound the chest to induce respiration; use bellows in the nostrils; and give sweet spirits of nitre, in ounce doses, at intervals of half an hour, till two or three doses have been given.

Chloral Hydrate is similar, both as to its effects and antidotes, to chloroform

Croton Oil is an acrid, irritant poison. It may be either swallowed or absorbed from the skin, and causes gastro-enteritis, drastic purgation, and great prostration. The treatment is that for superpurgation.



DRASTIC POISONING.

Characteristic appearance and action of a horse suffering from this cause.

Copper Sulphate is a corrosive, irritant poison, bringing on gastro-enteritis and diarrhœa; ulceration, perforation and thickening of the mucous membranes; quick, hard, almost imperceptible pulse; and, near smelting works, emaciation, paralysis and exostotic disease of the joints. These latter symptoms characterize the chronic, slow poisoning resulting

from grazing in the vicinity of these works, and inhaling the condensed fumes or eating the poison-tainted grass; and the remedy is self-suggestive, viz: to remove to a greater distance from the works. In the acute poisoning, give a pint of linseed oil, eggs, soap in small quantities, and milk, or flaxseed tea.

Corrosive Sublimate is frequently got hold of in the form of rat-poison, and is a corrosive, irritant poison, causing gastro-enteritis, erosion of the mucous membranes of the stomach and bowels, fœtid diarrhœa, salivation, fœtid breath, quick, weak pulse, and yellow appearance of mucous membranes. Give eggs and milk in large quantities, with occasional doses of opium—a drachm at a dose.

Ergot of Rye is a fungus that grows on rye and other kinds of grain, and which is developed on low, undrained soils by long continued damp weather. Large doses cause narcotism, colic, diarrhœa, and perverted nervous action; impairs the appetite; induces weakness and wasting, and serous—sometimes bloody—discharges from the mucous surfaces; and in a bad case, œdema and gangrene of the ears, tail, and even the limbs. Give a pint of linseed oil, following it with large quantities of flaxseed tea, and give a drachm of opium three or four times a day.

Ferrum Sulphas, (sulphate of iron), is a corrosive, irritant poison, causing the same symptoms as sulphate of copper. Give, as an antidote, galls, powdered, half an ounce; or, bi-carbonate of soda, an ounce. After a few minutes, give large quantities of flaxseed tea. Repeat the entire treatment every few hours.

Nux Vomica is an irritant poison, manifesting itself by tetanic spasms and general convulsions; convulsions of the diaphragm, causing labored breathing; and, sometimes, asphyxia. Give hydrated chloral in doses of half an ounce, every two hours, with occasional doses of opium; also, employ galvanism when practicable.

Opium is a narcotic poison, producing partial or total paralysis, stupor, stertorous (labored) breathing, slow pulse and contracted pupil. After death, the blood is fluid, and decomposition sets in early. Shower with cold water, give tannin, half a drachm, and an occasional dose of sweet spirits of nitre—half an ounce at a time; and force the animal to take exercise.

Lead, in all its forms, is a corrosive, irritant poison, which, in acute cases, produces violent constipation, delirium, colicky pains, tremor of the muscles, and gastro-enteritis. In chronic cases, where the symptoms develop slowly, there will be noticed what is called *Plumbism*—exostotic deposits, ankylosis of the joints, paralysis, staring coat, a blue line around the gums, emaciation, quick and wiry pulse; with fœces black, glazed and fœtid, the abdomen tucked up, and constant moaning. Give

epsom salts, two to four ounces ; after an hour, give iodide of potash, two or three drachms ; accompany these with occasional doses of opium in drachm doses ; put mustard paste to the belly ; and use large quantities of flaxseed tea,

Nitrate of potash, in large doses, is an irritant poison, causing gastro-enteritis, (with vomition in pigs), injected membranes, inflammation of the gullet, colic, etc., and it has a powerful sedative action on the heart. Give linseed oil, and follow it with flaxseed tea and whisky ; put mustard paste to the belly and over the gullet.

Common salt (or sodium chloride), in large quantities, acts as a corrosive, irritant poison, causing gastro-enteritis, injected mucous membranes, diarrhœa, weak and irritable pulse and excessive thirst ; also vomition in dogs and pigs. Give milk and eggs, with a drachm of opium every three or four hours ; if there is abnormal pain, apply mustard paste externally.

Sulphur is an irritant poison, causing diarrhœa, gastro-enteritis, emaciation, and ebullitions of sulphuretted hydrogen gas from the anus, (foul wind-breaking). Give a dose of oil, with opium ; also starch gruel, both internally and as an injection.

Strychnia is to be treated for the same as *nux vomica*.

Turpentine is an irritant poison, causing gastro-enteritis, strangury of the kidneys, quick and hard pulse, diarrhœa, and a violet odor and high color to the urine. Give a small dose of oil, with opium, starch gruel, and laudanum, both internally and as an injection ; put hot cloths to the loins.

White Hellebore, (*veratrum album*) is an irritant poison, causing vomition in dogs and pigs ; in the horse, intermittent pulse, gastro-enteritis, diarrhœa, spasms of the superficial muscles, salivation and great prostration. It is liable to be absorbed from the skin as well as taken internally, doing the same amount of damage in either case. Give eggs and milk in large quantities, and small doses of olive oil and sweet spirits of nitre.

III. Poisoning While Grazing.

Acorns when eaten in large quantities, cause gastro-enteritis ; constipation, followed by fluid fœces ; offensive breath ; glazed eyes ; quick, wiry pulse ; discharges from the nose ; and gnashing of the teeth. Post mortem examination discovers acorns in the stomach ; inflammation of the coats of that organ and of the bowels ; and, sometimes, ecchymosis and gangrene. In the case of cattle, *rumenotomy* must be performed to remove the undigested acorns. For horses, etc., give oil and gruel, with laudanum, and follow these with gentian root, in two to four drachm doses, three times a day.

Copper sulphate poisoning, in its chronic form, from grazing near smelting works, has been considered in the previous section.

The tobacco plant is a narcotic, irritant poison, causing gastro-enteritis, convulsions, metastatic inflammation, contracted pupil, sweating, intermittent pulse, diarrhœa, stertorous breathing, and stupor. Treat the same as for opium.

Sumach, or *Poisonous Oak*, is an acrid poison, causing gastro-enteritis, etc. Give oil, opium and flaxseed tea.

Lobelia is an acrid, narcotic poison, causing salivation, gastro-enteritis, feeble pulse, convulsions, and stupor. Give oil, opium and mild stimulants.

IV. Poisoning of the Skin.

Vegetable poisoning of the skin is not an uncommon occurrence, from the nose or lips of the animal coming in contact with some noxious weed or plant while grazing. There are many such plants, besides the poison oak and white hellebore noticed in the preceding section, such as poison ivy (or poison vine), hemlock, St. John's wort, etc. The symptoms of such poisoning correspond very nearly to those manifested in the human economy from the same cause, and which every one living in the country is familiar with. The treatment is both constitutional and local,—the former by the use of alteratives, together with such purgatives as may be required to keep the bowels moderately loose; the latter, by washing the irritated surface with a solution of sugar of lead, or other cooling and healing wash.

V. Poisoning from Stings.

In many sections, every farmer is liable, in the summer season, to have his team severely stung by hornets, bumble-bees, or the like; while in the Southwest, the torture inflicted on stock by the swarms of certain gnats and poisonous flies is fairly maddening. Then, too, a stock man in the latter section is almost sure to occasionally meet with such urgent cases as rattlesnake or tarantula bites.

A homely remedy for the sting of bees, wasps, etc., is to wash with salt and water; and this is excellent, in ordinary cases. Onion juice is another. For severe cases, it will be better to anoint the parts with a compound of hartshorn and oil,—three parts of the former to one of the latter; or spirits of turpentine and laudanum, in equal parts, will afford relief. It will be a good idea, if the irritation is very great, to sponge the whole body with lime water or a weak solution of soda, and then smear with linseed oil.

To protect against gadflies, wash the flanks and parts most likely to be attacked, with a strong infusion of the green bark of the *common elder*.

To protect against buffalo-gnats, etc., that are so troublesome in the lower Mississippi regions, smear the parts they most affect with a mixture of tar or lard, in the proportions of one to two, respectively; or instead, with equal parts of petroleum, lard oil (or bacon drippings), and tar.

For the bite of a rattlesnake, copperhead, or other venomous serpent, give the following as quickly as possible:

No. 90.	1 Teaspoonful of hartshorn,
	1 Pint of whiskey,
	$\frac{1}{2}$ Pint warm water,
	Mix.

Cauterize the wound immediately, with an iron at white heat; and keep the adjoining parts constantly wet for some hours, with ammonia, by means of a sponge. Unless the symptoms are urgent, the above recipe may be made up with half a pint (instead of a pint) of whiskey; but in every case it will be best to repeat this smaller dose every hour, till relief is obtained.

Stings of centipedes, scorpions and venomous spiders, (of which the tarantula is the most common), should be treated the same as snake bites; but, in these cases, it is not so customary to cauterize.

VI. The Loco-Weed Disease.

It is indeed rare that the domestic animals are poisoned by anything but poisonous plants. Occasionally, however, boiled Linseed Oil is given by mistake, or horses eat Paris green, but aside from this practically all stock poisoning is the result of eating one of the few poisonous plants that are found in nearly every pasture.

Loco Plants.—A large number of plants have been called by the name "loco weeds," most of those which were suspected of being poisonous belonging to the botanical family Leguminosæ, to which belong also the pea, alfalfa, and other similar plants. In western Texas, western Nebraska, western Kansas, and in portions of eastern Colorado the term "loco weed" was applied specifically to the plant known to botanists as *Astragalus mollissimus*.

Loco or Crazy Weed: Is a plant on the plains of the west, from six to twelve inches high, covered with minute hairs which give it a silvery look. It remains green throughout the winter.

The animal gets a mania for it, becomes unthrifty and dies of starvation.

Treatment: Keep animals away from it and feed nutritious food. Cattle or sheep may be disposed of by fattening.

Sorghum: The information concerning sorghum plant poisoning is comparatively new, and there are many points concerning which more information is needed. There seems to be plenty of evidence that stock, particularly cattle, may be poisoned by eating sorghum plants, especially plants that have been stunted by drouth or grown on very poor soil.

Symptoms: Those who have had a chance to study these cases report that the principal symptoms are stupor, jerking of the muscles, unsteady walk, and a discharge from the eyes. The pupils are frequently dilated, and skin lacks sensation. As the poisonous element in the sorghum plant is prussic acid, death results very rapidly and treatment for this reason is very unsatisfactory.

Prevention: Sorghum poisoning is most liable to occur when stock is first turned into a new field. Hence the trouble can usually be avoided by first putting in one animal for a few hours. If no harm is noticed then the entire herd can be turned in with safety.

Jointed Rush, Pine Top, Colt's Tail, or Equisetum: This is a very common weed, growing especially on damp, sandy or gravelly soils. It is probable that stock is poisoned from eating hay containing this plant much oftener than supposed. Horses are about the only animals poisoned by this plant. The younger ones seem to be more susceptible to it than the older ones. Cattle are not poisoned by it at all. However, this may be because they do not eat it.

Symptoms: The horse becomes unthrifty and very weak, with imperfect control of the hind legs. The appetite may be good, but the horse seems to get no nourishment from what it eats. He refuses to lie down until very late in the history of the case, when he struggles a great deal, and finally dies, apparently worn out from exhaustion. The pulse is slower than normal until very late in the case, when the patient's struggling causes it to rise. Old horses are less susceptible to this form of poisoning than younger ones. Horses having good grain feed seem to resist longer than those that are insufficiently fed. The poisonous effects of the plant seem to be confined entirely to the dry state; that is, stock rarely eat it while it is growing in pastures. For this reason it is troublesome only when it gets in the hay.

Treatment: Administer a cathartic, such as epsom salts or raw linseed oil. Discontinue using hay that contains the plant.

Wild Cherry Leaves: There are several varieties of wild cherries that cause stock poisoning, the most common being choke cherries and the common black cherries. The poisonous principle in wild cherry leaves is due, as in the above, to the presence of prussic acid. The young sprouts that come up around the tree seem to contain the greatest amount of this poison. The leaves are less poisonous when wilted than when green, and when entirely dry seem to be perfectly harmless. For this reason they seldom give any trouble in the hay.

Symptoms: The symptoms of wild cherry poisoning are practically the same as for other kinds of poisoning, where the trouble is the presence of prussic acid. There is a very weak pulse, difficult breathing, frightened expression to the eyes, with very prominent eye-balls, rapid breathing, with sudden death from paralysis of the respiratory organs. The animal's breath generally has a noticeable peach odor.

Treatment: If the animal has eaten a large quantity of the leaves, treatment is almost useless. It may be well to administer a cathartic as mentioned in the above treatment.

Loco Poisoning (Woolly Loco, Stemless Loco): Under this class of poisoning, we have two separate and distinct species. The Woolly Loco, a plant that is found growing extensively over the northwestern plains country, is silvery white in color, grows 8 to 10 inches high, with an abundance of soft foliage springing out in a cluster from a short central

stem, close to the ground. The flowers are pea-shaped, and usually purple. The second species, known as the Stemless Loco, is found in practically the same section of the country that the Woolly Loco is found. In appearance the two plants are very different. In the latter, the leaflets are longer and the seed has but one cell instead of two. It grows very erect with few branches.

Symptoms: The symptoms from poisoning by either one of the above species are practically the same. The effect of this poisoning is quite slow in making its appearance. In fact, the animal has acquired the habit for the weed before any marked symptoms appear. During the first stage of Loco poisoning, the horse seems to be a little out of balance mentally, and the eyesight shows symptoms of being impaired. After a while the horse becomes so fond of this plant that he seems to prefer it to other food which he might easily obtain. Care must always be exercised in turning horses into a poor pasture that contains this weed. It is generally when grass is short that the stock get to eating it. The second stage in the disease is characterized by a long period of general wasting away, both in strength and flesh, the animal becoming very thin and weak, the hair is dull, and the expression is one of feebleness. The total period of illness may last from a few months to two years.

Treatment: As yet there is no medicinal treatment that gives satisfaction. The only practical and satisfactory treatment is to remove the affected animal from the pastures containing the plant. Generally this is sufficient. However, if the animal has run down in flesh very much it may be necessary to give a tonic.

Rattle Box (*Crotalaria Sagittalis*): This is an annual, growing 3 to 8 inches high. The plant itself is hairy, the leaves are oval or lance shaped with very short stems. The flowers resemble those of the common pea; the pods are very dark in color or nearly black, and about an inch in length. When they become dry the seeds seem to loosen so that they rattle when shaken. It is from this characteristic that the plant gets its name. This plant grows in damp, sandy soils, and over a very large section of the country, especially along the Missouri River. Some seasons it causes a very serious loss. The poisonous principle has not been found as yet but it is apparently contained in both the seeds and the leaves. The greatest loss seems to occur when hay containing it is fed to the stock. Seldom giving any trouble in the green state, as it is found in pastures.

Symptoms: The symptoms of poisoning from this plant are rather slow in developing, death coming only after several weeks of gradual decline. The only two prominent symptoms to be observed are sleepiness and loud and difficult breathing.

Treatment: The treatment for poisoning from this plant is very unsatisfactory, aside from removing the cause, either by eliminating the plants from the pasture or hayfield, or by feeding hay that is known not to contain it. In handling cases of this kind it is advisable to give the horse a good tonic.

Water Hemlock, Wild Hemlock, Snake Weed, or Spotted Parsley: This plant is an erect perennial growing 3 to 6 feet high. The stem is hollow, with numerous branches and rather stiff or rigid. The flowers are white, growing in clusters. This plant is found chiefly on damp soils all the way from the Atlantic Coast to the Rocky Mountains. The poisonous principle seems to be an oily fluid which is found mostly in the roots, but

other portions of the plant also contain the poison to some extent. It should be remembered that the chief danger from poisoning comes from the roots and not from the leaves or stem. It is generally when the plant has been pulled up by the roots and stock gets at them, that the great danger occurs.

Symptoms: The most evident symptoms are acute pains in the stomach and intestines. The patient shows difficulty in walking, with a tendency towards convulsions and vomiting. Poisoning from this plant is fatal in nearly every case. Great care should be exercised that stock is not allowed to get at it.

Poison Hemlock: This plant was brought to the United States from Europe or Asia. It is now naturalized and quite common throughout the entire Eastern and Middle States, but not very common in the Mississippi Valley. In contrast with the Water Hemlock, the stems and leaves are not hairy or mealy, but perfectly smooth. The stem is hollow, more or less spotted with purple, and the plant is a biennial, growing from 2 to 7 feet high.

The leaves of this plant resemble the common parsley that grows in our gardens, and the flowers that appear in July and August grow in showy white clusters. When crushed, the leaves have a disagreeable flavor and odor. The poisonous element in this variety of hemlock is a volatile alkaloid known as Conine, found principally in the seeds and leaves. The root itself is not very dangerous in March, April and May, but becomes very poisonous later in the season. It is seldom that many specimens of this plant are found growing in the same field, but the very fatal nature of the poison makes even a few very dangerous.

Symptoms: The first indication of poisoning from hemlock is a gradual but steady weakening of the entire system, especially a loss of physical strength. The sight of the animal seems to be affected, but the mind remains perfectly clear. Death finally results from paralysis of the heart and blood vessels. The difference between poisoning from Water Hemlock and from Poison Hemlock consists mainly in the fact that convulsions are usually noticeable in the case of the former, while in the latter they never appear. In cattle the symptoms of poisoning from Poison Hemlock consists principally in the profuse flow of saliva, bloating, lack of appetite, feebleness and weak pulse, and severe pain.

Broad Leaf Laurel, Mountain Laurel, Poison Laurel, Sheep Laurel, Poison Ivy: This attractive shrub grows from 4 to 8 feet high, with thick, shiny leaves and rather showy pink flowers; appearing in May or June. The plant seems to prefer the rough, stony hillsides and mountain slopes of the Eastern States. The poisonous principle is in all portions of the plant with the exception of the wood. Horses are poisoned occasionally by this plant but the main losses occur among cattle and sheep.

Symptoms: A mild, persistent vomiting, with a flow of saliva, irregular breathing, impaired sight, dizziness, and a difficulty in controlling the limbs. Later in the course of the disease the respiration becomes irregular, with marked symptoms of drowsiness which generally passes into complete unconsciousness and finally death.

Treatment: The Department of Agriculture suggests as a treatment the internal use of one per cent alkaline solution of permanganate of potash.

Death Cama or Lobelia: In certain states, especially those of the Northwest, a very serious loss of stock occurs from poisoning by this plant. It

has been estimated that in Montana alone, over 3,000 sheep died in one year from this cause. The Death Cama prefers the moist, shallow basins of the western mountain pastures and plains. The plant itself is smooth, with a single stem, resembling the onion. In height it varies from 6 inches to 3 feet. Under ground there is an onion-like growth. The leaves dry up about midsummer and after this the danger is very slight. The flowers form a cluster and are yellow or yellowish white. The poisonous principle of this plant apparently resides in the fresh stem or bulb. It is owing to this that poisoning seldom occurs after the leaves are dry unless the stock get at the bulb.

Larkspurs: There are quite a number of species of Larkspurs, the majority of which are very serious when considering poisonous plants. They are erect herbs, with elongated clusters of showy blue flowers. It is from a peculiar projection on the flowers that the plant gets its name.

Symptoms: The symptoms from poisoning by this plant are practically the same with all the different species. The symptoms resemble aconite poisoning. In fact, the characteristic alkaloid of the larkspurs is similar in many respects to aconite. The effects on the system of larkspur poisoning and aconite poisoning are practically the same. The most noticeable symptoms are muscular spasms and a stiff, irregular, straddling walk, with persistent swallowing motions.

Treatment: Treatment for larkspur poisoning should be the same as for aconite. Belladonna or Atropia (the alkaloid of belladonna) has given very satisfactory results. The dose of atropia given with hypodermic syringe should be $\frac{1}{2}$ to 1 grain for cattle and horses and 1-10 to 1-3 grain for sheep.

General Treatment: As it is sometimes difficult to determine just what particular kind of plant the animal has been poisoned by, it will be advisable to consider a general treatment for all kinds of plant poisonings.

Keep on hand an ounce each of Permanganate of Potash and Aluminum Sulphate. When needed these should be dissolved in three quarts of water, care being exercised that all of the drugs are in solution, as otherwise they will settle to the bottom and the last dose will be too strong. The Aluminum Sulphate may be dissolved in the three quarts of water and kept on hand, tightly corked, but the Permanganate of Potash should not be added until needed, as it deteriorates very rapidly.

Dose of the Above: For horses, a single dose of the above solution is 4 ounces; cattle, 8 ounces; and sheep, 1 ounce.

CHAPTER XXVIII.

INSTRUMENTS, APPARATUS, AND MEDICINES.

- I. WHAT INSTRUMENTS TO KEEP, AND HOW TO USE THEM.—II. SURGICAL APPARATUS AND APPLIANCES.—III. A CHEAP AND SERVICEABLE SURGICAL OUTFIT.—IV. VETERINARY MEDICINES AND DOSES.—V. WHEN AND HOW OFTEN MAY THE DOSE BE REPEATED?—VI. SIMPLE DIRECTIONS FOR PREPARING AND USING MEDICINES.—VII. WEIGHTS AND MEASURES.—VIII. STANDARD REMEDIES AND THEIR APPLICATION.

I. What Instruments to Keep, and How to Use Them.

Bistoury.—For making incisions. It consists of a handle to which is attached a blade, variously shaped, according to the exact use intended, and either fixed or movable.

Catheter.—Used to draw off the contents of the bladder when the horse cannot make water in the natural way. Also used in treating deep ulcers, liquid being injected through them by means of a syringe. In veterinary practice, it is a round gutta percha tube, of which one end is open, and the other rounded with two openings at the side near by. Oil well, and introduce cautiously; then slowly push it along the canal or passage, taking care to occasion no unnecessary pain.

Firing-iron.—For making the actual cautery (burning with red-hot iron), which, though less practiced than formerly, is still useful in certain cases elsewhere specified. It is a heavy iron, with a blunt edge and a handle to hold it by.

Fleam.—Strictly speaking, one kind of lancet, and that which in old times was alone used in veterinary practice. The manner of using it is fully explained in the article on bleeding. The incision must always be made lengthwise of the vein.

Forceps.—Used for extracting splinters, pieces of bone, etc., and in the operation of lithotomy and lithotritry; also, for seizing arteries in order to tie them. They are simply pincers with long jaws. Those with a spring are much to be preferred.

Knives.—At least three or four different knives should be kept, and always keen and bright, for surgical purposes—some rounded and others pointed at the top. (See scalpel and shoeing-knife.)

Lancets.—There are two kinds, thumb and spring lancets, these names being derived from the power that operates them. They are a great improvement upon the fleam, which is their primitive form. We give the preference to the thumb lancet.

Needles (surgical).—For sewing up wounds, etc. They are of different shapes as well as different sizes. (See seton needles.)

Probang.—A straight, flexible rod, with a sponge on one end, for pushing substances down the throat, in cases of strangulation. Two kinds are shown in the cut on page 412.

Probe.—For exploring wounds. They are made of silver wire with one end slightly knobbed, and of different sizes.

Scalpel.—A surgeon's knife, straight and keen edged. For veterinary purposes, it should be broad and strong.

Scissors (curved).—Indispensable for trimming the edges of wounds, clipping off the hair, etc.

Seton needles.—For drawing setons under the skin. Their blades are broad and curved, with a round shaft eighteen inches long and one eye at the blunt end.

Shoeing-knife.—Sometimes called the frog-knife or drawing knife, being the knife used by blacksmiths for cutting into and paring the hoof, in horseshoeing. It is a thin blade with a sharply curved end, fixed in a handle, and will be found quite useful in the care of the horse's feet, in health, as well as in treating the same when diseased.

Syringe.—There are regular horse and cattle syringes now procurable. For giving small doses of liquid medicines one that can be worked with one hand is almost indispensable. The old-fashioned pail and india-rubber pipe is a clumsy, yet in most cases, efficient substitute in giving injections. A small syringe for injecting abscesses, cleaning wounds, etc., will also be desirable.

Trocar.—A simple surgical instrument, resembling a pointed awl. It is now generally provided with a cannula, which is a hollow tube enclosing it. (See cut on page 360.) Its uses in puncturing the abdomen, chest, &c., have been repeatedly given elsewhere, the cannula, as a rule, being allowed to remain in the orifice, as a channel for the escape of the water, serum, or gas, as the case may be.

II. Surgical Apparatus and Appliances.

In addition to the instruments described in the last section, there are various apparatus and appliances which the stock owner should always keep on hand, or at least have at ready command in case of need. The following list will, we think, be found sufficiently complete for all practical purposes.

Drenching bottle.—This is now generally used, instead of the old-time drenching-horn. It should hold a quart at least, and have a long neck. A champagne or ale bottle will be about the thing.

Liobbles.—To prevent a horse from kicking; more especially, for use in casting. (See article on casting in chapter XXII of this Part.) They are two strong ropes, each about twenty-five feet long, with the same number of strong leather straps, doubled, each with a two inch seam between and a strong buckle. It requires three or four men to cast a horse. Put a loose collar on the horse, and fasten both ropes securely to the bottom of it, or, better (if the rope is long enough), loop the middle to the collar. Buckle one of the two leather straps tightly on each hind pastern; through the rings or D's of the straps pass the ends of the rope, carrying the same forward through the collar, for the assistants, (standing well ahead) to pull away at, while a good man manages the animal's head. To prevent kicking (while standing), fasten the ends of the rope to the collar, after drawing sufficiently tight.

Ligatures.—Cords or strings, most commonly silk thread, used for tying arteries and thus preventing or stopping hemorrhage. Tie with a surgeon's knot, made by passing one end around the other twice and then drawing tightly.

Nose-bag.—This should be roomy, and be kept scrupulously clean.

Seton.—A cord or small roll of leather, tape or cloth, drawn under the skin and then out again at a short distance, by means of the seton needle. It is used to promote and keep up a discharge of pus, and thus reduce inflammation, and, the better to secure this end, it is soaked with turpentine or smeared with some other irritant, and daily turned or drawn forward and backward through its channel. Setons have almost entirely superseded the old-fashioned rowel, which is a ring of leather, suitably prepared and pushed down into a pocket made in the skin.

Slings.—These are well illustrated on pages 294 and 338. They are not so difficult to make as many imagine. Take, for the 'girdle which passes under the horse's belly, a broad strip of leather or strong canvass twenty-eight inches wide and about seven feet long, stiffening the ends by sewing them around smooth sticks or chunks of wood, to which fasten very strong loops of rope. Double blocks and pulleys being attached to these loops by strong ropes passing through fixed pulleys overhead, the animal can be nearly or entirely lifted from his feet, as may be desired. This girdle is kept in proper position by suitable breeching and breast-straps attached to it, as shown on page 338.

Sponges.—From four to six of these should always be at hand, of which at least one (a small one) should be very fine. Their sizes should be graduated, the largest being such as are often used for washing carriages.

Tents.—Like setons, these are suppuratives, but are employed in the dressing of wounds. They consist of pledgets of tow, lint, or the like, moistened with turpentine.

Twitch.—This has been described and illustrated in the chapter on Operations. One should be kept hanging in the stable constantly, ready for immediate use.

III. A cheap and serviceable Surgical Outfit.

The following convenient outfit will serve the purposes of the great majority of horsemen, and can be selected, at very moderate cost, from the stock of any surgical instrument dealer. Most of the instruments, in fact, can be bought at the larger drug stores of cities. Everything should be kept together, in a neat wooden box.

1. A thumb lancet, and, if wished, a fleam.
2. A pair of spring forceps.
3. A bistoury, blunt pointed. The slightly curved form, with the sharp edge on the inside, is considered the best for most purposes.
4. An aneurismal (a long, blunt) needle, which is also very serviceable for introducing small setons.
5. A silver probe.
6. A shoeing (or frog) knife.
7. A pair of curved scissors.
8. A broad scalpel, for which, however, any straight, broad-bladed knife, with a keen edge, may be substituted.
9. A seton needle.
10. A few surgical needles, of different sizes and shapes; some white thread, and thin cat-gut or, instead of the latter, fine sewing silk. A leather case or roll will be needed to keep these articles in.

IV. Veterinary Medicines and Doses.

The following list comprises the principal drugs used in veterinary practice, those of them not among the farmer's own stores being easily procurable at any drug store. Many of these it will be advisable to keep always on hand,—say enough for ten doses,—everything in white bottles, the latter well corked and carefully labeled. Corrosive substances it will not do to cork; the stoppers must be ground glass. When medicines have been kept so long that they have lost their strength, they should be thrown away, and replaced with fresh. Old compounds not likely to be used again soon, ought not to be kept with the other medicines. The best plan is to throw them away, as they will only clutter up any cupboard. You may put them in, and ten to one, even if you want to use the same prescription again, you will decide to compound it afresh.

Aconite, tincture of.—Sedative, diaphoretic. Horse, 10 drops; ox, 30 to 40 drops; sheep, 3 to 5 drops.

Alcohol.—Stimulant, diuretic, narcotic. Horse, $\frac{1}{2}$ ounce; ox, 3 to 6 ounces; sheep, $\frac{1}{2}$ ounce. Locally, a cooling astringent.

Aloes, Barbadoes.—Purgative. Horse, 4 to 6 drachms

Alum.—Astringent. Horse, 2 to 3 drachms; ox, 3 to 4 drachms; sheep, $\frac{1}{2}$ to 1 drachm.

Ammonia, liquid.—Diffusible stimulant, anti-spasmodic, antacid, diuretic. Horse, $\frac{1}{2}$ ounce; ox, $\frac{1}{2}$ to 1 ounce; sheep, $\frac{1}{2}$ to 1 drachm. It should be well diluted.

Ammonia, carbonate of.—Diffusible stimulant, anti-spasmodic, antacid, diuretic. Horse, 1 drachm; ox, 4 to 6 drachms; sheep, $\frac{1}{2}$ to 1 drachm.

Anise seed, caraway, cardamon, fennel seed.—Stomachic, carminative. Horse, 1 ounce; ox, 1 to 2 ounces; sheep, 2 to 4 drachms.

Arnica, tincture of.—Stimulant, diuretic. Horse, 1 drachm; ox, 1 drachm; sheep, 1 scruple.

Asafetida.—Diffusible stimulant, carminative, vernifuge. Horse, 2 drachms; ox, 4 drachms; sheep, $\frac{1}{2}$ to 1 drachm.

Balsam of Peru.—Stimulant, antispasmodic, expectorant. Horse, 1 ounce; ox, 1 to 1 $\frac{1}{2}$ ounces; sheep, 2 drachms.

Borax.—Nerve sedative, uterine stimulant. Horse, 2 to 6 drachms; ox, $\frac{1}{2}$ to 1 ounce; sheep, $\frac{1}{2}$ to 1 drachm.

Blackberry root.—Astringent. Horse, 2 to 4 drachms; ox, $\frac{1}{2}$ ounce; sheep, 2 scruples.

Camphor (gum).—Antispasmodic. Horse, 1 to 2 drachms; ox, 2 to 4 drachms; sheep, 1 scruple.

Carbolic acid.—Sedative, anodyne, astringent, antiseptic, disinfectant. Horse, 10 to 20 drops; ox, 1 drachm; sheep 10 drops.

Cherry bark, wild.—Expectorant. Horse, 1 ounce; ox, 1 $\frac{1}{2}$ ounces; sheep, 3 drachms.

Copaiva.—Stimulant, diuretic, expectorant. Horse, 2 to 4 drachms; ox, 3 to 4 drachms; sheep, $\frac{1}{2}$ to 1 drachm.

Creas of tartar.—Diuretic. Horse, $\frac{1}{2}$ ounce; sheep, 4 to 6 drachms. Laxative: horse, 5 ounces; ox, 5 to 8 ounces; sheep, 1 to 2 ounces.

Ergot.—Checks bleeding, parturient. Horse, $\frac{1}{2}$ to 1 ounce; ox, 1 ounce; sheep, 1 to 2 drachms.

Iron, peroxide.—Tonic. Horse, 2 drachms; ox, 4 drachms; sheep, 1 drachm. An antidote to arsenic.

Laudanum.—Narcotic, sedative, anodyne, antispasmodic. Horse, 1 to 2 ounces, ox, 2 ounces; sheep, 2 to 3 drachms. The druggist calls this *tincture of opium*.

Lime, chloride of.—Checks tympany, disinfectant. Horse, 2 drachms; sheep, 1 to 2 drachms.

Linseed oil.—Laxative. Horse, 1 to 2 pints; ox, 1 to 2 quarts; sheep, $\frac{1}{2}$ pint.

Lobelia.—Sedative, antispasmodic, expectorant. Horse, 1 to 2 drachms; ox, 1 to 3 drachms; sheep, 15 grains; swine, 5 to 15 grains.

Lunar caustic (nitrate of silver).—Nerve tonic. Horse, 5 grains; ox, 5 to 8 grains; sheep, 1 to 2 grains.

Mallow.—Demulcent. Give freely of cold infusion.

Oak bark.—Astringent. Horse, 1 ounce; ox, 2 to 4 ounces; sheep, 4 drachms.

Olive oil.—Laxative. Horse, 1 to 2 pints; ox, 2 to 3 pints; sheep, 3 to 6 ounces.

Opium.—Narcotic, sedative, anodyne, antispasmodic. Horse, $\frac{1}{2}$ to 2 drachms; ox, 2 to 4 drachms; sheep, 10 to 20 grains.

Pepper, black.—Stomachic, stimulant. Horse, 2 drachms; ox, 3 drachms; sheep, 1 to 2 scruples.

Peppermint.—30 to 60 drops.

Pumpkin seeds.—Vermifuge, tæniafuge (tape-worm medicine). Horse, 1 pint.

Rhubarb.—Laxative, tonic. Horse, 1 ounce; ox, 2 ounces; sheep, 1 drachm.

Rosin.—Diuretic. Horse, 2 drachms; ox, $\frac{1}{2}$ to 1 ounce; sheep, 2 to 4 drachms.

Soap.—Diuretic, antacid, laxative. Horse, $\frac{1}{2}$ ounce; sheep, 2 to 6 drachms.

Sweet spirits of nitre.—Stimulant, antispasmodic, diuretic, diaphoretic. Horse, 1 to 2 ounces; ox, 3 to 4 ounces; sheep, 3 to 6 drachms.

Tobacco.—Sedative, antispasmodic, vermifuge. Horse, 4 drachms; ox, 4 to 6 drachms; sheep, 1 drachm.

Tar.—Expectorant, antiseptic. Horse, $\frac{1}{2}$ to 1 ounce; ox, $\frac{1}{2}$ to 2 ounces; sheep, $\frac{1}{2}$ ounce.

Turpentine, oil of.—Stimulant, antispasmodic, diuretic. Horse, 1 to 2 ounces; ox, 1 to $1\frac{1}{2}$ ounces; sheep, 1 to 2 drachms. Vermifuge: Horse, 2 ounces; ox, 2 to 3 ounces; sheep, 4 drachms.

Valerian.—Diffusible stimulant, antispasmodic, vermifuge. Horse, 2 ounces; ox, 2 to 4 ounces; sheep, $\frac{1}{2}$ ounce.

Zinc, sulphate of.—Astringent, tonic. Horse, $\frac{1}{2}$ drachm; ox, 2 to 3 drachms; sheep, 15 to 30 grains.

V. When and How Often may the Dose be Repeated?

The graduation of doses, according to age, condition, etc., has been

explained on page 278. We add the following *general* directions for the reader's guidance in repeating the dose.

Alteratives.—Give twice or thrice daily.

Anodynes.—Four hours apart till they effect their object.

Anti-spasmodics.—Same as anodynes.

Diaphoretics.—Same as alteratives.

Diuretics.—Two to four hours apart, according to urgency of the case.

Emetics.—These are not given to the horse, his anatomy being such that vomiting is not possible. For other animals, repeat every five or ten minutes, assisting their action by opening the mouth and irritating the throat with a feather.

Febrifuges.—Two to four times daily.

Narcotics.—Four hours apart till the desired effect is produced.

Purgatives.—As these are usually very powerful, overdosing must be guarded against, by waiting till the first dose has had full time to operate. This will be not less than thirty-six hours for the horse; twelve to fifteen hours for sheep and cattle; and seven to ten hours for hogs. Draughts of lukewarm water, or of warm gruel, hasten the action of purgatives.

Refrigerants.—Twice or thrice daily.

Sedatives.—Every four hours, as long as necessary.

Stimulants.—Four hours apart till the desired effect is produced.

Tonics.—Twice or three times daily.

VI. Simple Directions for Preparing and Using Medicines.

Balls.—Made of drugs (in powdered form) mixed with honey or molasses and linseed meal to about the stiffness of dough, and then wrapped in tissue paper, oiled for greater ease in swallowing. Care must be taken not to make it too large. A little thicker than a man's thumb will be right for horses and cattle. The ball must not be round, but cylindrical in shape, as shown in the cuts given in Chapter XXI, of this Part.

Drenches.—Made, when the remedial agent is itself not a liquid, either as decoctions or as infusions. The latter are made with either cold or hot water. Small quantities of powdered drugs can be mixed with thick gruel or mucilage, and given as a drench. Directions for giving drenches will be found on pages 279 and 544. Care must be taken to thoroughly dilute strong irritating liquids, so that if held in the animal's mouth for as much as five minutes, it will do no harm. There are some liquids of this class, as oil of turpentine, croton oil, etc., that will not mix with water, and hence should be prepared with olive or linseed oil, or milk beaten with eggs; or, in some cases, they may be given in mucilage.

Hypodermic injections.—From the rapidly increasing use of these expedients by physicians, there seems to be a growing disposition to

employ them in veterinary practice also. They can only be administered with a hypodermic syringe, and, as a rule, ought not to be resorted to without the advice of a competent surgeon.

Injections or Enemas.—These are not at all difficult to give, especially if one has a regular horse syringe. Patent injectors that pump in the liquid continuously are in the market. (See article "Syringe," in Section I, this chapter.)

VII. Weights and Measures.

In compounding drugs it is necessary to be very exact as to weights and measures. The druggist, with his delicate scales and expertness in manipulation, is the best person to put up your veterinary prescription, if it is otherwise convenient to have him do so. Frequently this is not the case, however, and we therefore recommend farmers to provide themselves (as can be done at small expense) with a pair of scales and a measuring glass for liquids. The weights for the former should be according to what is called apothecaries' weight, instead of avoirdupois, while the glass will be already marked according to wine measure, so called.

TABLE OF APOTHECARIES' WEIGHT.

20 grains make one scruple,
3 scruples make one drachm,
8 drachms make one ounce,
12 ounces make one pound.

TABLE OF WINE MEASURE.

60 minims, or drops, make one drachm,
8 drachms make one ounce,
16 ounces make one pint,
2 pints make one quart,
4 quarts make one gallon.

Sufficient accuracy in fluid measure for anything not violent in its action, will be the following:

60 drops, or 1 tea-spoonful, make 1 drachm,
4 tea-spoonfuls, or 1 table-spoonful, make $\frac{1}{2}$ ounce,
2 table-spoonfuls make 1 ounce,
1 wine-glassful makes 2 ounces,
1 tea-cupful makes 5 ounces,
1 tumblerful makes $\frac{1}{2}$ pint.
1 tin-cupful (commonest size) makes 1 pint.

A handful of flaxseed, or other seeds usually innocent in their nature, will weigh about 2 ounces; a handful of leaves or dried herbs will weigh about 1 ounce.

VIII. Standard Remedies and their Application.

Ammonia, Aromatic Spirits of.—Preparation composed of Ammonium Carbonate, Alcohol, Aqua Ammonia. It contains a perfume that kills the odor of Ammonia. This is one of the best Ammonia preparations for internal use. Good in colics, indigestion, impactions, etc. Dose: Horse, $\frac{1}{2}$ to 1 ounce; cattle, 1 to 2 ounces; sheep, 2 drachms; hogs, 1 drachm. Dilute with at least sixteen times its amount of water.

Ammonium Chloride, Sal Ammoniac.—Used as a mild stimulant, affecting principally the mucous membrane, such as the linings of the

throat, nostril, and alimentary canal. Used in cases of coughs, colds, etc. Dose: Horse, 2 to 3 drachms; cattle, 3 to 4 drachms; sheep, $\frac{1}{2}$ to 1 drachm.

Anise Seed.—Stimulates digestion and sweetens the stomach. Also used as a tonic when recovering from a weakening disease. Dose: Horse, 1 ounce; cattle, 1 to 2 ounces; sheep, 2 to 4 drachms; dogs and swine, 1 to 2 drachms.

Areca Nut.—Is made from the ground seed of a palm. Generally used to destroy tapeworms. Best given in combination with Oil of Male Fern. Dose: Horse, $\frac{1}{2}$ to 1 ounce; sheep, $\frac{1}{2}$ ounce; lambs, 2 drachms.

Arnica, Tincture of.—Causes sweating and reduces fever. Dose: Horse, $\frac{1}{2}$ to 1 ounce; cattle, 1 ounce; sheep, 2 drachms; swine, $\frac{1}{2}$ drachm. Also used externally as a liniment for sprains and bruises.

Arsenic.—Commonly called White Arsenic. Is a heavy white powder and very poisonous. Extreme care should be used in giving it to animals. Use in chronic indigestion, lung disorders, such as heaves, and skin disorders. Dose: for a horse, 2 to 5 grains; cattle, 4 to 7 grains. In the case of small animals it is best to use it in the form of Fowler's solution as it is more safely handled.

Arsenic (Fowler's Solution).—A slightly milder form of the above, and generally preferable as it is not quite as dangerous. Used as a tonic for animals recovering from very weakening diseases, such as distemper. Dose: Horse, $\frac{1}{2}$ to 1 ounce; cattle $\frac{1}{2}$ to 1 ounce; sheep, $\frac{1}{2}$ to 1 drachm; swine, 5 to 30 drops.

Asafetida, Gum.—Used for colic, indigestion, constipation, and worms. Dose: Horse, 2 to 4 drachms; cattle, 4 drachms; sheep, 1 drachm. Can be either given in a ball or dissolved in alcohol and then diluted in water.

Asafetida, Tincture of.—This is simply a solution in alcohol of the gum and is used for the same diseases as the above. Dose: Horse, 2 ounces; cattle, 3 to 4 ounces; sheep, $\frac{1}{2}$ ounce; swine, 1 to 2 drachms.

Belladonna, Fluid Extract of.—Used in fevers, cramp colic, tetanus, caked udder. Small doses are best, and full doses should never be given oftener than three or four times a day. Dose: Horse, $\frac{1}{2}$ to 1 drachm; cattle, 1 drachm; sheep, 20 drops; swine, 3 to 8 drops.

Benzoin, Compound Tincture of, (Friar's Balsam.) Chiefly used for healing wounds. Can be either painted over the wound with a feather, twice a day, or mixed with lard or vaseline, forming an ointment, in proportion of one part of Benzoin to four or five parts of lard or vaseline.

Biniiodide of Mercury.—Is used chiefly as a blister, for bony enlargements, such as spavins, ringbones, sidebones, splints, etc. Should always be mixed with lard or vaseline to the proportion of 1 to 2 drachms of the drug to an ounce of vaseline.

Blackberry Root.—Is an astringent, that is, it causes contraction of the vital structures. Dose for the horse: 2 to 4 drachms; cattle, $\frac{1}{2}$ ounce; sheep, 40 grains.

Borax.—A white powder sometimes used as a mild antiseptic. Can also be used internally. Dose: Horse, 2 to 6 drachms; cattle, $\frac{1}{2}$ to 1 ounce; sheep, $\frac{1}{2}$ to 1 drachm.

Boric Acid.—A non-poisonous antiseptic. Used for sore mouth, sore eyes, rupe, etc. Used in solution 1 ounce to a pint of water.

Bromide of Potash.—Chief use is to quiet the nerves in diseases like lock-jaw, convulsions, chorea, etc. Dose: Horse, $\frac{1}{2}$ to 1 ounce; cattle, 1 ounce; sheep, 1 drachm; swine or dogs, $\frac{1}{4}$ drachm.

Buckthorn—Cascara Sagrada.—Used mostly as a physic for dogs and cats. Dose of the Fluid Extract: Horse, 1 to 2 ounces; dogs, $\frac{1}{2}$ to 2 drachms.

Butter of Antimony.—Use pure as a caustic to burn out proud flesh, old sores and fistulæ. This drug is very powerful and must not be allowed to come in contact with live flesh. The sore must be dry before it is applied. Never use internally.

Calibar Bean, Fluid Extract of.—Obtained from the seeds of a certain plant. Used for colic, impaction, and bowel disorders. Generally combined with Jaborandi. Dose: Horse, $\frac{1}{2}$ to 1 drachm; cattle, 1 to 2 drachms; sheep, 20 to 30 drops.

Calomel.—Used internally as a physic to expel worms. Externally it may be dusted on old sores to dry them up. Dose: Horse, $\frac{1}{2}$ to 1 drachm; cattle, 1 to 2 drachms; sheep and swine, 5 to 20 grains.

Camphor, Gum.—Good in colic, diarrhea, coughs, and lessen pain. Dose: Horse, 1 to 2 drachms; cattle, 2 to 4 drachms; sheep, 1-3 drachm.

Camphor, Spirits of.—This is a solution of the gum in alcohol in the proportion of one part of the gum to ten parts alcohol. Dose: Horse, $\frac{1}{2}$ to 1 ounce; cattle, 1 to 2 ounces; sheep, 2 drachms; swine and dogs, 10 drops to $\frac{1}{2}$ drachm. Generally given with water. Externally it is sometimes used to relieve pain in the case of sprain.

Cantharides.—See Spanish Flies.

Carbolic Acid.—One of the most common and efficient antiseptics. As sold by druggists it is a colorless, oily liquid, and liable to turn pink on exposure to light. In treating wounds it should be greatly diluted. A good proportion will be one ounce of the acid to a quart of water. This will make about a 3% solution. It is a very active poison and should be used with care. Used occasionally internally. Dose: Horse, 10 to 30 drops; hogs, 3 to 10 drops. Must be well diluted with water.

Carrom Oil.—This is a mixture of Lime Water and Linseed Oil, in equal parts. A very useful preparation in treating burns and wounds of a similar nature.

Castor Oil.—A most excellent purgative, and it can be used where harsher ones would not be advisable. In small doses it may be combined with laudanum, making an excellent remedy for scours. Dose: Horse, 1 to 2 pints; calves, 2 to 4 ounces; sheep, 4 ounces; swine, 2 ounces.

Caustic Potash.—This is a very strong alkali and can generally be purchased in the form of sticks. Used for burning out warts and similar growths, cauterizing poisonous wounds, and also for dehorning calves. The sticks should be kept in well-corked bottles as they will deteriorate if left in contact with the air. Wet the sticks before applying and hold with a paper, as they will destroy the flesh. The burn from Caustic Potash is as bad as an acid burn.

Charcoal.—Is a mild antiseptic. In a finely powdered form it is used for dusting wounds and sores. It is used in a great many stock foods and condition powders. Its active principle being to neutralize gases.

Cherry Bark, Wild.—The bark of the roots is preferable to that of the tree proper. It is generally given in the form of an infusion or cold tea. Very useful in all diseases of the digestive tract.

Chloral Hydrate.—This drug is generally used to lessen pain and quiet the nerves of the patient. Used principally in hysteria and other nervous diseases. Dose: Horse, $\frac{1}{2}$ to 1 ounce; cattle, 1 to 2 ounces; sheep, 1 to 2 drachms; hogs, $\frac{1}{2}$ to 1 drachm.

Chloroform.—Stimulant, anodyne (relieves pain), anesthetic (produces insensibility). Its stimulating effect resembles that of alcohol but is less pronounced and more temporary. Chloroform is very useful in colic and other spasmodic conditions. Should be given internally with 6 to 8 times its bulk of raw linseed oil, well shaken together. Dose: Horse, 4 to 8 drachms repeated every two or three hours; sheep and hogs, take $\frac{1}{4}$ to 1 drachm.

Chloride of Potash.—Is used internally for sore throat and like disorders; if the animal cannot swallow the solution may be sprayed into the throat with a syringe or placed on the tongue as a paste, mixed with flour or molasses. Dose: Horse, 1 to 2 drachms; cattle, 2 to 4 drachms; sheep, $\frac{1}{2}$ drachm; swine and dogs, $\frac{1}{2}$ drachm.

Copaiva, or Copaiba.—This drug comes from a tree native to South America. It is a stimulant and is also used in certain catarrhal conditions of the system. Dose: Horse, 2 to 4 drachms; cattle, 3 to 4 drachms; sheep $\frac{1}{2}$ to 1 drachm.

Copperas, Sulphate of Iron.—One of the best of the mineral tonics. Also used as a wash for wounds. Excellent internally for diarrhea. One of the principal ingredients in condition powders. Dose: Horse, 1 drachm; cattle, 2 drachms; sheep, 20 grains; swine, 10 grains.

Corrosive Sublimate—Bichloride of Mercury.—One of the most powerful antiseptics and disinfectants there is. The general proportion to be used is about 1 part of the Corrosive Sublimate to 1,000 parts of water.

One drachm of Corrosive Sublimate to 1 gallon of water will make about the proper proportion. This is the best disinfectant for stables and farm buildings, as well as one of the cheapest. Great care must be used in handling it as it is very poisonous.

Cream of Tartar.—Laxative and diuretic. Dose: Horse, $\frac{1}{2}$ ounce; sheep, 4 to 6 drachms. Not used as much as formerly.

Creolin.—Antiseptic and disinfectant. This is one of the cold tar products. Very valuable in treating wounds, scratches, grease, and diseases of a like character. Is used also to destroy parasites of all kinds. A proper proportion will be 1 to 3 parts Creolin to 100 parts of water. It should be bought pure and diluted only as needed.

Croton Oil.—A powerful purgative that should only be used when milder means have failed, as in impaction of the rumen and in diseases of a like character. Dose: Horse, 15 to 30 drops; cattle, $\frac{1}{2}$ to 1 drachm; sheep, 5 to 10 drops; swine and dogs, 2 to 3 drops. For horses and cattle it should be given in a pint of linseed oil; for sheep, given in half a pint of oil.

Crude Petroleum.—This is generally used in making hoof oils and as a remedy for ringworm on domestic animals. It is a very cheap and effective remedy.

Digitalis, Fluid Extract of.—Used in weakening diseases, such as influenza, distemper, lung troubles, and whenever the heart is weak. It is a powerful heart and lung tonic. It is also sometimes used for heaves. Dose: Horse, 20 drops to $\frac{1}{2}$ drachm; cattle, $\frac{1}{2}$ to 1 drachm; sheep, 5 to 15 drops; swine, 1 to 3 drops.

Epsom Salts.—Used principally as a purgative for cattle and sheep. Dose: cattle, 1 to 3 pounds; sheep, 2 to 4 ounces; horse, $\frac{1}{2}$ to 1 pound; hogs, 1 to 2 ounces. This should be administered in the form of a drench by dissolving the salt in warm water. It generally acts in about 24 hours.

Ether, Sulphuric.—This drug is used about the same as Chloroform. that is, it produces insensibility when inhaled. Ether may be given internally as a stimulant in cases of colic, indigestion, etc. Dose, internally: Horse, $\frac{1}{2}$ to 1 ounce; cattle, 1 to $1\frac{1}{2}$ ounces; sheep, 2 to 4 drachms; hogs, 1 to 2 drachms.

Ercot.—Checks bleeding and may also be used in parturition and internal bleeding. Dose: Horse, $\frac{1}{2}$ to 1 ounce; cattle 1 to 2 ounces; sheep, 1 to 2 drachms.

Fowler's Solution.—See Arsenic.

Gamboge.—Is a very powerful physic. Used mostly for cattle where milder remedies, such as Salts and Castor Oil, have failed. It is generally given in combination with other medicines.

Gentian, Fluid Extract.—This is an alcoholic solution of Gentian root. Used as a tonic during recovery from a debilitating disease. The dose is the same as for the powder.

Gentian Root Powder.—This is a bitter tonic that is used very extensively in condition powders and patent stock foods. Dose: Horse, 2 drachms; cattle, 4 drachms; sheep, 1 drachm; swine, $\frac{1}{2}$ drachm.

Ginger.—A mild stimulant; sweetens the stomach and neutralizes gases. Is used in combination with physic drenches to prevent griping; also good in colic, indigestion, and many other disorders of the alimentary canal. Dose: Horse, $\frac{1}{2}$ to 1 ounce; cattle, 1 to 2 ounces; sheep, 2 drachms; pigs, 1 drachm.

Glauber's Salts (Sulphate of Soda).—This is an excellent purgative for cattle and sheep. The action same as Epsom Salts, only not quite as certain. Dose: Cattle, 1 to $1\frac{1}{2}$ pounds; sheep, 2 to 4 ounces. Dissolve in water and give as a drench.

Glycerine.—Used externally to soften the skin. Two to 4 ounces in warm water makes an excellent injection.

Hyposulphite of Soda.—Antiseptic and deodorant. Especially valuable for internal administration. Used to check fermentation in the stomach and intestines, therefore valuable in conditions of diarrhea, indigestion, and bloat. This drug is readily soluble in water and should be given as a drench. Dose: Horse, 2 to 4 ounces; cattle, 4 to 6 ounces; sheep, $\frac{1}{2}$ to 1 ounce.

Iodide of Potash.—When given internally it acts as an absorbent. Used in dropsy of the belly or chest to absorb the fluids that have accumulated there. May also be used where there is a thickening about the throat, legs, or milk glands. Care must be exercised in its use, as it will produce a condition in the system known as iodism; animal goes off feed, hair becomes rough, skin harsh and wrinkled, and a discharge is seen in the eyes and nose. If these symptoms appear, discontinue its use for a short time. Dose: Horse, $\frac{1}{2}$ to 1 drachm twice a day; cattle, 1 to 2 drachms.

Iodine, Tincture of.—Seldom used internally. Externally used as a blister to reduce enlarged glands, wind puffs, etc. Paint the parts once a day until a blister is formed, then grease and let it heal. When healed wash the affected parts with soapy water and repeat the blister. Continue this until cured. It may also be injected into old sores and fistulæ once in two or three days. Sometimes used to destroy ringworms.

Iodoform.—Used generally for local or external application. Is a deodorizer and prevents infection in wounds. As a local antiseptic it is very useful in dressing wounds, especially after they have commenced to heal. May be used alone or mixed with twice its bulk of boracic acid.

Iron Peroxide.—Used as a tonic in certain diseases, also as an antidote for arsenic poisoning. Dose: Horse, 2 drachms; cattle, 4 drachms; sheep, 1 drachm.

Jaborandi, Fluid Extract.—This is a product of a certain plant. Its use stimulates secretions of the glands of the stomach. Good for colic and

impactions. Dose: Horse, 2 to 4 drachms; cattle, $\frac{1}{2}$ to 1 ounce; sheep, $\frac{1}{2}$ to 1 drachm.

Kerosene.—Internally it is used for stomach worms. Externally it may be made into an emulsion with soap and used to kill parasites, such as lice, ticks, etc. Internal dose for lambs: 1 to 2 drachms in 4 ounces of oil or milk.

Lard.—May be used in place of vaseline. When used fresh on irritated skin it has a softening and soothing effect. It may be also given internally as a purgative for small animals. Melt and give 1 to 8 ounces according to size.

Laudanum—Tincture of Opium.—Used both internally and externally to relieve pain. Dose: Horse, 1 ounce; cattle, 1 to 2 ounces; sheep, 2 drachms; swine and dogs, 5 to 20 drops. Care must always be exercised in using this drug as it is very poisonous when used in large doses.

Lime Water.—Is made by slacking fresh lime, using as much as the water will take up in solution. Allow to settle and use the clear liquid. This preparation is useful in diarrhea in young animals. Dose: Calves, 1 to 6 ounces.

Lime.—Finely pulverized or air-slaked lime is valuable in drying up old sores. The unslaked lime is valuable for disinfecting stables and buildings that animals are kept in. Used in the form of whitewash makes one of the best preventatives against lice and vermin in the poultry house.

Lime, Chloride of.—Principal use is as a disinfectant. Also used internally in cases of bloat in horses and sheep. Dose: Horse, 2 drachms; sheep, $\frac{1}{2}$ to 1 drachm.

Linseed Oil, Raw.—Used as a mild physic or laxative. Commonly used in connection with colic remedies, as it has a soothing action on the stomach and intestines. Externally it may be applied with Carbolic Acid, 1 part of the acid to 25 parts Linseed Oil, for scratches. Dose (internally): Horse, 1 to 2 pints; cattle, 2 to 3 pints; sheep, $\frac{1}{4}$ pint; calves 4 to 8 ounces; lambs, 2 ounces.

Lobelia.—This is one of the poisonous plants of the Northern Hemisphere. Is used to counteract the action of certain vegetable poisons, such as Poison Ivy. For this purpose it should be mixed with Whiskey and applied externally.

Mercury.—See Calomel and Corrosive Sublimate.

Monse's Solution of Iron.—This preparation is one of the very best for stopping the flow of blood. It is very astringent. Is used in leaking of the navel. Should be applied about three times a day with a feather.

Morphine, Sulphate of.—This is another of the drugs made from opium, having the same action only much more powerful; not so constipating as opium and thus better to use in cases of colic and impactions. May conveniently be given hypodermically. Dose, by the mouth: Horse, 3 to 10 grains; cattle, 6 to 10 grains; sheep, $\frac{1}{2}$ to 2 grains.

Mustard.—Used chiefly for plasters in severe cases of colic, inflammation of the bowels, diseases of the chest and throat, and over the loins in kidney affections. If mixed with warm water in the form of a paste it acts as a mild blister. A plaster of ordinary strength may be made by using $\frac{1}{4}$ pound ground mustard, 2 tablespoons of flour, and tepid water or vinegar, sufficient to make a paste. In severe cases omit the flour, using only the mustard and vinegar. Apply by rubbing into the hair over the part on which a blister is desired.

Niter.—See Sweet Spirits of Niter.

Nitro—Hydrochloric Acid.—This is a mixture of Nitric and Hydrochloric Acids. Used to stimulate the secretions of the glands in the intestinal tract. This is very valuable in certain kinds of indigestion with torpidity of the liver. Dose of the medicinal acid: Horse, 1 to 2 drachms; cattle, 2 to 4 drachms; sheep, 20 to 40 drops; hogs, 10 to 20 drops.

Nux Vomica—(Powdered Seed).—This drug is used as a tonic in paralysis and weak, debilitated conditions of the system in general. The active principle in this drug is strychnine, and when twitching of the muscles occurs its use should be discontinued. Poisonous. Dose: Horse, $\frac{1}{2}$ to 1 drachm; cattle, 2 drachms; sheep, 20 grains; swine, 10 grains.

Nux Vomica, Fluid Extract of.—The action on the system of this drug is the same as above. Generally used in connection with Gentian in cases of impactions, constipation, etc. Dose, same as the powder.

Nitrate of Silver—(Lunar Caustic).—This is simply a pencil form of Silver Nitrate, much used for cauterizing warts, growths, snakebites, proud flesh, etc. Sticks must be kept in tightly corked bottles to prevent dissolving. To use, simply wet and apply the same as Caustic Potash. A solution of 2 to 5 grains in an ounce of water is sometimes used for inflammation of the eyes.

Nitrate of Potash—Salt Peter.—Its chief action is on the blood and kidneys, causing the latter to secrete a large amount of urine. It reduces fevers and dropsical swellings. Dose: Horse, 1 to 4 drachms; cattle, $\frac{1}{2}$ to 1 ounce; sheep, $\frac{1}{2}$ to 1 drachm.

Oak Bark Tea.—Good for diarrhea. If used externally it dries up sores and toughens the skin. Dose: Colts and calves, 1 to 2 ounces; lambs, $\frac{1}{2}$ ounce. Best given in milk. To make: Boil an ounce of Oak Bark in a pint of water.

Oil of Tar.—This is a principal constituent of cough syrups. For chronic coughs it makes a very effectual remedy. Dose for the horse: 1 teaspoonful three times a day. May be either given in the feed, or placed on the tongue with a spoon.

Oil of Male Shield Fern.—This is a very effectual remedy for tapeworms. Dose: Horse, 3 to 4 drachms in a pint of raw Linseed Oil; cattle, same as the horse; sheep and swine, 1 to 2 drachms in $\frac{1}{2}$ pint of oil.

Olive Oil.—Mild laxative. Externally it may be mixed with Carbolic Acid in the proportion of 1 drachm of Acid to 4 ounces of the oil, and used as a dressing for wounds. Dose as a laxative: Horse, 1 to 2 pints; cattle, 2 to 3 pints; sheep, 3 to 6 ounces.

Opium.—This drug is made from the dried juice of a certain kind of poppy. Can be purchased either in the gum or powdered form. It is the basic principle in morphine and drugs of a similar nature. It is used to lessen pain; stops the activity of the bowels and thus should not be used in colic, but is very valuable in diarrhea. Laudanum, which is simply an alcoholic solution of opium, is the most convenient form in which to use this drug. Dose of opium: Horse, $\frac{1}{2}$ to 1 drachm; cattle, 1 to 2 drachms; sheep, 5 to 20 grains; hogs, 3 to 10 grains.

Pepper, Black.—Sometimes used in its ground form to warm the stomach and bowels, in cases of colic, indigestion, etc. Dose: Horse, 1 tablespoonful; cattle, 1 tablespoonful; sheep and swine, $\frac{1}{2}$ teaspoonful.

Peppermint, Essence of.—Sometimes used in indigestion and colic. Give in sweetened water. Dose for the horse: 40 drops to 1 drachm; cattle, 1 to 2 drachms; sheep, 10 drops.

Pumpkin Seeds.—This is one of the oldest and best known remedies for tapeworms. Dose: Horse, 1 pint.

Quinine, Sulphate of.—In small doses Quinine is used as a bitter tonic. In larger doses it reduces fever. Dose: Horse, $\frac{1}{2}$ to 1 drachm; cattle, 2 to 4 drachms; sheep, $\frac{1}{2}$ drachm; pigs, 10 grains.

Rhubarb.—This is a laxative and tonic. Dose: Horse, 1 ounce; cattle, 2 ounces; sheep, 1 drachm.

Rosin.—Diuretic. Not used as much as formerly. Dose: Horse, 2 drachms; cattle, $\frac{1}{2}$ to 1 ounce; sheep, 2 to 4 drachms.

Salol.—This drug is made from Salicylic Acid and Carbolic Acid. It is one of the best known remedies for rheumatism. Dose: Horse, 1 to 3 drachms; cattle, 3 to 5 drachms; sheep, $\frac{1}{2}$ to 1 drachm; hogs, 20 to 40 grains.

Salts.—See Epsom and Glauber's Salts.

Salt, Common.—Useful as a food in small amounts. A solution of 1 ounce of the salt in a pint of water makes a good wash for sores and wounds.

Saltpeter.—See Nitrate of Potash.

Soda, Bicarbonate of—(*Baking Soda*).—This is useful in indigestion but should always be given before feeding. When wet with water it makes a good paste to apply to bee stings. Dose: Horse, 2 drachms to 1 ounce; cattle, $\frac{1}{2}$ to 1½ ounces; sheep, 1 drachm to $\frac{1}{2}$ ounce; swine, 2 drachms.

Spanish Fly, (Cantharides).—Seldom given internally. Principally used in making blisters for reducing enlargements, such as curbs, tumors and thickenings after wounds have healed. Generally used in connection with lard or vaseline. A proper proportion being 1 to 3 drachms of Can-

tharides to 1 ounce of lard or vaseline, as the case may require. If to be used on cattle the blister may be made a little stronger.

Strychnine.—This is a very poisonous drug, made from *Nux Vomica*. It is a very powerful nerve tonic. Dose: Horse, 1 to 2 grains; cattle, 2 to 3 grains; sheep, $\frac{1}{4}$ to $\frac{1}{2}$ grain. If the drug is to be used hypodermically the dose will be about one-half the above.

Sugar of Lead, (*Acetate of Lead*).—Should be used for external application only, as it is very poisonous. Very good for healing sores and wounds for which purpose dissolve 1 ounce in $1\frac{1}{2}$ pints of water.

Sulphate of Copper—*Blue Vitriol*—*Blue Stone*.—Is an astringent antiseptic and mild caustic. Internally it is sometimes used for checking discharges, such as nasal gleet, or chronic catarrh. Externally it is used to burn out proud flesh in ulcers and old wounds. For this purpose it may be either dusted on or applied in solution. Dose internally: Horse, $\frac{1}{2}$ to 1 drachm; cattle, 1 drachm; sheep, 10 to 20 grains.

Sulphur—Internally it acts on the blood as a purifier. Externally it is used for lice and to destroy parasites and germs on the skin. Dose: Horses and cattle, $\frac{1}{2}$ ounce; sheep, 1 drachm; swine, 20 grains. It may be mixed with lard in a proportion of 1 ounce sulphur to 6 ounces of lard, forming an ointment that is very good for all skin diseases.

Sweet Spirits of Niter—*Spirits of Nitrous Ether*.—Given in small doses it acts on the kidneys and skin, reducing fever. In large doses it acts on the stomach and bowels, relieving pain and neutralizing gases. Good in various forms of indigestion and colic. Dose: Horse, 1 to 2 ounces; cattle, 2 to 3 ounces; sheep, 3 to 6 drachms; swine and dogs, 1 to 2 drachms.

Tincture of Chloride of Iron—*Muriate of Iron*.—Used as a tonic to stop bleeding and also as a wash in sore throat, sore mouth, and various skin diseases. Dose: Horse, $\frac{1}{2}$ to 1 ounce; cattle, 1 ounce; sheep, $\frac{1}{2}$ to 1 drachm; swine, 10 to 30 drops. As an external application use $\frac{1}{2}$ ounce of the tincture to 8 ounces of water. The dose of the strong liquid Chloride of Iron is one-fourth as much as the tincture.

Turpentine—*Spirits of Turpentine*—*Oil of Turpentine*.—Used for colic, bloating and intestinal worms. It also has a stimulating action on the kidneys. Best given in oil, gruel or milk. Dose: Horse, $\frac{1}{2}$ to 1 ounce; cattle, 1 to 2 ounces; sheep, 1 to 3 drachms; swine, 1 drachm. Externally is used in many blistering liniments.

Valerian.—Is a diffusible stimulant. Also used sometimes for worms. Dose: Horse, 2 ounces; cattle, 2 to 4 ounces; sheep, $\frac{1}{2}$ ounce.

Vaseline.—This is another of the coal tar products. Its only action on the skin is to soften it. It is also used as a base for ointments and blisters. Fresh lard may be substituted.

Vinegar.—Used externally as a cooling, stimulating lotion. Occasionally used hot in poultices. Internally it may be given in small doses diluted with water for cooling fevers.

CHAPTER XXIX.

RECIPES FOR THE HORSE.

As a matter of convenience to the reader, to whom time will often be precious in treating his sick stock, we add this chapter, resuming all our prescriptions for the horse.

NO. 1. LOTION FOR FISTULA.

Sulphate of copper, 2 drachms,
Water, $\frac{1}{2}$ pint,
Mix.
Inject once or twice a day.

NO. 2. LOTION FOR FISTULA.

Sulphate of zinc, 3 drachms,
Water, $\frac{1}{2}$ pint,
Mix.
Inject once or twice a day.

NO. 3. LOTION FOR FISTULA.

Corrosive sublimate, 1 drachm.
Water, $\frac{1}{2}$ pint,
Mix.
Inject once or twice a day.

NO. 4. FEVER MIXTURE.

Sweet spirits nitre, 1 ounce,
Tincture aconite root, 1 drachm,
Nitrate of potash, 1 ounce,
Water, $\frac{1}{2}$ pint,
Mix.
Give a tablespoonful every 2 hours.

NO. 5. CARBOLIC LOTION.

Carbolic acid, 1 part,
Water, 30 parts,
Mix.
Inject three times a day.

NO. 6. CARBOLIC LOTION.

Carbolic acid, $\frac{1}{2}$ ounce,
Water, 1 pint,
Mix.
Use three or four times a day.

NO. 7. WHITE LOTION FOR FLESH WOUNDS.

Sulphate of zinc, 6 drachms,
Sugar of lead, 1 ounce,
Water, 1 pint,
Mix and shake.
Apply three times a day.

NO. 8. HOOF OINTMENT.

Pine tar, 4 fluid ounces,
Whale oil, 4 ounces,
(If too thin in warm weather, add
mutton tallow, 2 ounces),
Mix.
Apply once a day.

NO. 9. FLY BLISTER.

Powdered cantharides, $\frac{1}{2}$ ounce,
Lard, 2 ounces,
Mix.
Rub well in.

NO. 10. RED MERCURIAL BLISTER.

Binioidide of mercury, 2 drachms
Lard, 2 ounces,
Mix.
Rub well in.

NO. 11. COMPOUND LINIMENT.

Tincture of iodine, 3 ounces,
Aqua ammonia, 1 ounce,
Oil of turpentine, 1 ounce,
Glycerine, 1 ounce,
Mix.
Rub well in twice a day.

No. 12. COOLING LOTION.

Muriate of ammonia, 1 ounce,
Nitrate of potash, 1 ounce,
Water, 1 quart,
Mix.
Apply three times a day.

No. 13. COOLING LOTION.

Vinegar (strong), 1 pint,
Common salt, a handful,
Water, 1 pint,
Mix.
Apply three or four times a day.

No. 14. LINIMENT FOR SPRAINS.

Liquor ammonia, 1 ounce,
Tincture arnica, 1 ounce,
Tincture opium, 1 ounce,
Oil turpentine, 1 ounce,
Alcohol, 1 ounce,
Water to make 1 pint,
Mix.
Rub well in twice a day.

No. 15. LINIMENT FOR SPRAINS.

Tincture arnica, $1\frac{1}{2}$ ounces,
Tincture of opium, 1 ounce,
Liquor ammonia, $1\frac{1}{2}$ ounces,
Water to make 1 pint,
Mix.
Rub well in twice a day.

No. 16. DIURETIC POWDER.

Rosin, 2 ounces,
Nitrate of potash, 2 ounces,
Powder and mix.
Divide into twelve powders, and give
one night and morning in soft
feed.

No. 17. IODINE LOTION.

Iodine, 1 drachm,
Iodide of potash, 1 drachm,
Alcohol, 1 ounce,
Water to make 1 pint,
Mix.
Inject twice a day.

No. 18. FEVER MIXTURE.

Tincture aconite root, 1 drachm,
Fluid extract belladonna, 2 drachms,
Sweet spirits nitre, 2 ounces,
Carbonate of ammonia, 1 ounce,
Nitrate of potash, 1 ounce,
Water to make 1 pint,
Mix.
Give a tablespoonful every 2 hours.

No. 19. PASTE FOR OPEN JOINT

Carbolic acid, 1 drachm,
Glycerine, 2 drachms,
Flour, enough to make a paste,
Mix.
Make a paste, and apply to the cut
twice a day.

No. 20. TONIC POWDER.

Sulphate of iron, 2 ounces,
Cinchona bark, 2 ounces,
Powder and mix.
Divide into twelve powders, and give
one night and morning in the feed.

No. 21. FEVER MIXTURE.

Tincture aconite root, 1 drachm,
Sweet spirits nitre, $1\frac{1}{2}$ ounces,
Nitrate of potash, $1\frac{1}{2}$ ounces,
Water to make 1 pint,
Mix.
Give a tablespoonful every two
hours.

No. 22. TONIC POWDER.

Sulphate of iron, $1\frac{1}{2}$ ounces,
Nitrate of potash, 2 ounces,
Powder and mix.
Divide into twelve powders, and give
one night and morning in soft
feed.

No. 23. PURGATIVE BALL.

Barbadoes aloes, 5 drachms,
Ginger, 1 drachm,
Gentian root, 1 drachm,
Syrup or soap, enough to combine
foregoing,
Powder and mix.
Make a ball, and give as one dose.

NO. 24. ASTRINGENT WASH.

Sugar of lead, 1 ounce,
Water, 1 pint,
Mix.
Apply three times a day.

NO. 25. LOTION FOR BRUISE.

Tincture of arnica, 1 ounce,
Laudanum, 1 ounce,
Water to make 1 pint,
Mix.
Apply three times a day, and bandage.

NO. 26. ACID LOTION.

Hydrochloric acid, $\frac{1}{2}$ ounce,
Water, 1 pint,
Mix.
Apply twice a day.

NO. 27. LOTION (ANODYNE.)

Tincture of arnica, 1 ounce,
Tincture of opium, 1 ounce,
Water to make 1 pint,
Mix.
Apply three times a day without a bandage.

NO. 28. LOTION FOR ULCERATED BONE.

Hydrochloric acid, 2 drachms,
Water, $\frac{1}{2}$ pint,
Mix.
Apply twice a day.

NO. 29. STRONG CARBOLIC LOTION.

Carbolic acid, $\frac{1}{2}$ ounce,
Linseed oil, $\frac{1}{2}$ pint,
Mix.
Apply three times a day.

NO. 30. FEVER MIXTURE.

Tincture aconite root, 1 drachm,
Fluid extract belladonna, 2 drachms,
Water, 4 ounces,
Mix.
Give a tablespoonful every 2 hours.

NO. 31. ABSORBING OINTMENT.

Iodide of potash, 2 drachms,
Lard, 2 ounces,
Mix.
Apply once a day with friction.

NO. 32. TANNIC LOTION.

Tannic acid, $\frac{1}{2}$ ounce,
Vinegar, 1 ounce,
Water, 1 quart,
Mix.
Apply three times a day.

NO. 33. DIURETIC POWDER.

Rosin, 2 ounces,
Nitrate of potash, 2 ounces,
Linseed meal, 2 ounces,
Powder and mix.
Give a tablespoonful morning and night in the feed.

NO. 34. TONIC POWDER.

Sulphate of iron, $1\frac{1}{2}$ ounces,
Nitrate of potash, 1 ounce,
Fœnugreek seed, 2 drachms,
Linseed meal, 2 ounces,
Powder and mix.
Give a tablespoonful morning and night in the feed.

NO. 35. TONIC MIXTURE.

Tincture of iron, 1 ounce,
Tincture of gentian, 1 ounce,
Water, 10 ounces,
Mix.
Give two tablespoonfuls three times a day.

NO. 36. POWDER FOR RHEUMATISM.

Colchicum seed (powdered), 1 ounce,
Nitrate of potash, 1 ounce,
Fœnugreek seed, 2 drachms,
Mix.
Divide into twelve powders, and give one night and morning in soft feed.

NO. 37. ALTERNATIVE COMPOUND.

Epsom salts, 4 ounces,
Nitrate of potash, 2 ounces,
Linseed meal, 4 ounces,
Mix.
Give a tablespoonful twice a day in soft feed.

No. 38. ALTERATIVE MIXTURE.

Potassium iodide, 2 ounces,
Water, 1 pint,
Mix.

Give a tablespoonful morning and
night.

No. 39. CARBOLIC LOTION.

Carbolic acid, 2 drachms,
Water, 1 pint,
Mix.

Inject three times a day.

No. 40. FEVER MIXTURE.

Sweet spirits nitre, $1\frac{1}{2}$ ounces,
Tincture aconite root, 1 drachm,
Fluid extract belladonna, 2 drachms,
Tincture gentian, 1 ounce,
Nitrate of potash, 1 ounce,
Muriate of ammonia, 1 ounce,
Water to make 1 pint,
Mix.

Give a wineglassful every two hours
in bad cases, and three or four times
a day in mild cases.

No. 41. AMMONIA BLISTER.

Liquor ammonia, 2 ounces,
Oil turpentine, 2 ounces,
Linseed oil, 2 ounces,
Mix.

Rub well in once a day till mildly
blistered.

No. 42. POWDER FOR HEAVES.

Powdered lobelia seed, 2 ounces,
Linseed meal, 2 ounces,
Mix.

Divide into eight powders, and give
one night and morning in soft feed;
wait a week, and repeat.

No. 43. COUGH POWDER.

Gum camphor, $1\frac{1}{2}$ ounces,
Powdered digitalis, 1 ounce,
Linseed meal, 2 ounces,
Mix.

Divide into twelve powders, and give
one night and morning in soft feed.

No. 44. PROF. DICK'S COUGH RECIPE.

Gum camphor, 1 drachm,
Opium, 1 drachm,
Digitalis, 1 drachm,
Calomel, 1 drachm,
Mix.

Make a ball with syrup, and give as
one dose, repeating once a day for
a week; wait a week, and repeat.

No. 45. COUGH MIXTURE.

Prussic acid, dilute, 2 drachms,
Tincture of camphor, 1 ounce,
Fluid extract belladonna, 3 drachms,
Tincture gentian, 1 ounce,
Chlorate of potash, 1 ounce,
Water to make 1 pint,
Mix.

Give two tablespoonfuls three times
a day, with a syringe.

No. 46. LOTION FOR SORE MOUTH.

Borax, 1 ounce,
Honey, 1 ounce,
Water to make 1 pint,
Mix.

Apply three times a day.

No. 47. MIXTURE FOR FLATULENCE.

Bi-carbonate soda, 1 teaspoonful,
Ginger, 1 ounce,
Water, $\frac{1}{2}$ pint,
Mix.

Give as one dose.

No. 48. A STRONG PURGATIVE.

Barbadoes aloes, 6 drachms,
Linseed oil, 1 pint,
Mix.

Give as one dose.

No. 49. STIMULATING MIXTURE.

Whiskey, 2 ounces,
Extract ginger, 1 ounce,
Water, $\frac{1}{2}$ pint,
Mix.

Give as one dose.

NO. 50. MIXTURE FOR COLIC.

Sweet spirits nitre, 1½ ounces,
Tincture opium, 1 ounce,
Extract ginger, ½ ounce,
Water, ½ pint,
Mix.

Give as one dose.

NO. 51. MIXTURE FOR WIND COLIC.

Chloroform, ½ ounce,
Linseed oil, 1 quart,
Mix.

Give as one dose.

NO. 52. ANODYNE MIXTURE.

Sulphate of morphia, 4 grains,
Water, ½ ounce,
Mix.

Give as one dose.

NO. 53. MIXTURE FOR WIND COLIC.

Bi-carbonate soda, a tablespoonful,
Water, a teacupful,
Mix.

Give as one dose.

NO. 54. MIXTURE FOR WIND COLIC.

Oil turpentine, 1 ounce,
Linseed oil, ½ pint,
Tincture of opium, 1 ounce,
Mix.

Give as one dose.

NO. 55. MIXTURE FOR WIND COLIC.

Chloroform, 1 ounce,
Linseed oil, 1 pint,
Mix.

Give as one dose.

NO. 56. MIXTURE FOR CONSTIPATION.

Linseed oil, 1 quart,
Tincture nux vomica, 1 ounce,
Mix.

Give as one dose.

NO. 57. CROTON OIL LINIMENT.

Croton oil, 1 ounce,
Linseed oil, 3 ounces,
Mix.

Rub in well to the belly.

NO. 58. MIXTURE FOR DIARRHOEA.

Prepared chalk, 1 ounce,
Ginger, 1 ounce,
Opium, 1 drachm,
Starch gruel, 1 pint,
Mix.

Give as one dose.

NO. 59. ASTRINGENT MIXTURE.

Linseed oil, ½ pint,
Opium, 1 drachm,
Tincture catechu, 1 ounce,
Mix.

Give as one dose.

NO. 60. ASTRINGENT MIXTURE.

Tincture catechu, 1 ounce,
Spirits of camphor, ½ ounce,
Tincture opium, 1 ounce,
Starch gruel, 1 quart,
Mix.

Give as one dose.

NO. 61. ANODYNE INJECTION.

Tincture opium, 1 ounce,
Sulphuric ether, 1 ounce,
Starch, 1 quart,
Mix.

Give as injection.

NO. 62. ANODYNE MIXTURE.

Bromide potassium, 8 ounces,
Water, 1 pint,
Mix.

Give two tablespoonfuls three times a day.

NO. 63. MIXTURE FOR TETANUS.

Fluid extract belladonna, 2 ounces,
Prussic acid (dilute), 2 ounces,
Water to make 8 ounces,
Mix.

Give a tablespoonful three times a day.

NO. 64. NERVE TONIC.

Nux vomica, 1 drachm,
Gentian root, powdered, 2 drachms,
Linseed meal, ½ ounce,
Mix.

Give as one dose. Repeat morning and night for a month.

No. 65. MIXTURE FOR SUNSTROKE.

Whiskey, 2 ounces,
Sweet spirits of nitre, $\frac{1}{2}$ ounce,
Nitrate of potash, 1 drachm,
Water, 4 ounces,

Mix.

Give as one dose, and repeat as the case requires.

No. 66. ALTERNATIVE AND TONIC.

Potassium iodide, 1 drachm,
Nux vomica, 1 drachm,
Fœnugreek seed, 1 drachm,

Mix.

Give as one dose, and repeat morning and night for three or four weeks.

No. 67. TONIC POWDER.

Nux vomica, 1 drachm,
Sulphate iron, 1 drachm,
Fœnugreek seed, 1 drachm,

Mix.

Give as one dose, and repeat morning and night for three or four weeks.

No. 68. TONIC FOR PURPURA.

Tincture muriate of iron, 1 ounce,
Tincture gentian, 1 ounce,
Water to make 4 ounces,

Mix.

Give a tablespoonful every 2 hours.

No. 69. MIXTURE FOR PURPURA.

Oil turpentine, 1 ounce,
Linseed oil to make 4 ounces,

Mix.

Give a tablespoonful every 2 hours.

No. 70. IRON LOTION.

Tincture muriate of iron, 1 ounce,
Water, $\frac{1}{2}$ pint,

Mix.

Apply locally.

No. 71. BALL FOR DIABETES.

Iodine, 1 drachm,
Iodide potash, $\frac{1}{2}$ drachm,
Linseed meal, enough to combine the foregoing.

Mix.

Make a ball and give as one dose.

No. 72. LEAD LOTION.

Sugar of lead, $\frac{1}{2}$ ounce,
Vinegar, 1 ounce,
Water to make 1 quart,

Mix.

Inject a little once a day.

No. 73. SILVER LOTION.

Nitrate of silver, 15 grains,
Water, $\frac{1}{2}$ pint,

Mix.

Inject a little twice a day.

No. 74. IODINE LOTION.

Iodine, 1 drachm,
Potash iodide, 1 drachm,
Water, $\frac{1}{2}$ pint,

Mix.

Inject a little twice a day.

No. 75. ZINC LOTION.

Sulphate of zinc, 2 drachms,
Water, 1 pint,

Mix.

Inject twice a day.

No. 76. LEAD LOTION.

Sugar of lead, 3 drachms,
Water, 1 pint,

Mix.

Inject twice a day.

No. 77. CAMPHORATED OIL.

Gum camphor, 1 ounce,
Olive oil, $\frac{1}{2}$ pint,

Mix.

Apply three times a day.

No. 78. COOLING MIXTURE.

Chlorate of potash, 2 ounces,
Water, 1 quart,

Mix.

Give four ounces three times a day.

NO. 79. ALTERNATIVE MIXTURE.

Iodide of potash, 1 drachm,
Water, $\frac{1}{2}$ pint,
Mix.

Give as one dose, repeating three times a day.

NO. 80. EYE LOTION.

Atropin sulphate, 2 grains,
Water, 1 ounce,
Mix.

Apply four or six times a day.

NO. 81. EYE LOTION.

Nitrate of silver, 5 grains,
Water, 1 ounce,
Mix.

Apply twice a day.

NO. 82. EYE LOTION.

Nitrate of silver, 10 grains,
Water, 1 ounce,
Mix.

Apply twice a day.

NO. 83. WORM POWDER.

Sulphate of iron, 1 drachm,
Tartar emetic, 1 drachm,
Linseed meal, 2 drachms,
Mix.

Give as one dose. Repeat morning and night for a week, and follow it with No. 84.

NO. 84. WORM DRENCH.

Oil turpentine, 1 ounce,
Linseed oil, 1 pint,
Mix.

Give as one dose.

NO. 85. LOTION FOR LICE.

Tobacco, 2 pounds,
Water, 3 gallons,
Mix.

Steep, and wash the animal.

NO. 86. LOTION FOR LICE.

Quassia chips, 3 pounds,
Water, 1 gallon,
Mix.

Steep one hour, and wash the animal.

NO. 87. OINTMENT FOR MANGE.

Sulphur, 4 ounces,
Oil of tar, 2 ounces,
Linseed oil, $\frac{1}{2}$ pint,
Mix.

Rub well in once a day to all affected spots.

NO. 88. CORROSIVE SUBLIMATE WASH.

Corrosive sublimate, 40 grains,
Water, 1 pint,
Apply once a day till cured.

NO. 89. ANTACID POWDER.

Bi-carbonate of soda, 2 ounces,
Powdered gentian, 1 ounce,
Linseed meal, 2 ounces,
Mix.

Give a tablespoonful morning and night in soft feed.

NO. 90. MIXTURE FOR SNAKE BITES, ETC.

Aqua ammonia, 1 teaspoonful,
Whiskey, 1 pint,
Water (warm), $\frac{1}{2}$ pint,
Give as one dose. Repeat every hour, but reducing the quantity of whiskey one-half, till the animal is evidently out of danger.

NO. 91. FEVER MIXTURE.

Sulphate of quinine, 4 drachms,
Whiskey, 1 pint,
Water, 1 pint,
Give a wineglassful every two hours in bad cases, and every four hours in milder ones.

NO. 92. TONIC MIXTURE.

Tincture of nux vomica, 1 ounce,
Tincture of gentian, 1 ounce,
Water to make 1 pint,
Mix.

Give a wineglassful every two to four hours.



CHAMPION JERSEY COW, IMP., "JERSEY VENTURE."

BOOK II

PART I

CATTLE

HISTORY, MANAGEMENT AND CHARACTERISTICS
OF THE VARIOUS BREEDS



REGISTERED JERSEYS—BRED AND OWNED BY THE UNIVERSITY OF MISSOURI.

These six cows produced 4,314 pounds of butter in one year, average of 719 pounds each. This butter was sold at an average price of 32 cents per pound.

CATTLE.

CHAPTER I.

EARLY HISTORY AND TYPICAL BREEDS OF CATTLE.

- I. WILD AND SEMI-WILD HERDS.—II. THE FIRST CHRONICLERS AND BREEDERS OF CATTLE.—III. THE ORIGINAL TYPE.—IV. UNDOMESTICATED HERDS OF EUROPE AND ASIA.—V. SPANISH-AMERICAN BREEDS.—VI. THE DEVONS.—VII. THE HEREFORDS.—VIII. THE DURHAM OR TEESWATER BREED.—IX. IRISH CATTLE.—X. SCOTCH AND HIGHLAND CATTLE.—XI. SWISS CATTLE.—XII. DUTCH CATTLE.—XIII. FOSSIL CATTLE.—XIV. THE WILD CATTLE OF ENGLAND.—XV. NATIVE DISTRICTS OF SOME BREEDS.

I. Wild and Semi-Wild Herds.

Where horned cattle first existed in a wild state is utterly unknown, and their origin is equally uncertain. There are a number of species of the same genus—the genus *Bos*—existing in a wild state; such as the Bison, misnamed Buffalo, of America, and the true Buffalo of Africa. There are, also, so-called wild cattle which roam in vast herds in North and South America, and in some parts of Europe and Asia. These, however, as well as all others of the genus *Bos Taurus*, to which our present domesticated cattle belong, are, when found wild, the descendants of animals which escaped from the control of man at some period, more or less remote.

II. The first Chroniclers and Breeders of Cattle.

Jubal, the son of Lamech, who lived in the time of Adam, is recorded in Scripture as being “the father of such as have cattle.” Still, it cannot be assumed that Jubal’s cattle were in any way identical with the domestic ox of later times, for the word “cattle” is used by the early Scriptural writers to denote nearly all grazing animals, including sheep and goats. Job, however, who lived more than two thousand years before Christ, is distinctly spoken of as the possessor of one thousand yokes of oxen. Homer, eighteen hundred years before the Christian era, wrote celebrating the noble bullocks, with golden knobs on the tips of their horns, and he minutely describes the manner of fastening the knobs. Juno, among the pagan goddesses, is called ox-eyed, from the clearness and liquid expression of those features. Jeremiah, sixty-two years before

Christ, speaks of a "fair heifer;" and Virgil, about the time of the Christian era, wrote admiringly of the beautiful cattle of the Roman Campagnas, and of their value in husbandry.

The Egyptians worshipped the bull Apis, and, it is probable that they were the first to domesticate the ox. That the domestication of horned cattle was anterior to that of the horse is more than probable.

III. The Original Type.

What the first cattle were like is mainly a matter of conjecture. The Egyptian hieroglyphics, the most ancient known, leave us entirely in the dark as to what the cattle of that remote antiquity resembled. No description of the original type has come down to us. The earliest drawings, or pictures of cattle, represent them as being rugged in form, of great length, gaunt, and with upright, spreading horns, somewhat like the descendants of Spanish cattle now running wild in Central America.

IV. Undomesticated Herds of Europe and Asia.

The Steppes of Tartary still nourish vast droves of semi-wild cattle, that are not regularly herded, and are wild to all intents and purposes. In Hungary, also, and in Russia, and on the grassy plains of all the more temperate climates of Asia, herds of cattle abound that are as wild as neglect on the part of their owners can make them.

Cattle have been reared by every Celtic nation from the earliest period, and have been regarded by all barbarians and pagan people as the greatest of the divine gifts to man. The herds ran half-wild when ever these tribes migrated, until, as civilization advanced, the least desirable breeds were exterminated, while the fittest survived in a state of real domestication. Descendants of one of these ancient breeds, are still seen in the Chillingham cattle of England; they are wild only because all possible means are used to keep them so. The wildest and least frequented tracts of two extensive parks are set apart for their use. They are probably the descendants of the best of the ancient cattle of Great Britain.

V. Spanish-American Breeds.

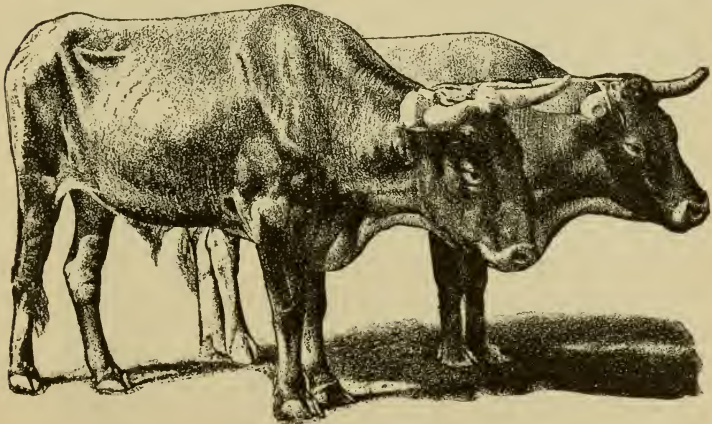
In Texas and on the plains of Mexico, in Central America, and in the sub-tropical and more temperate regions of South America, there are immense herds of cattle, the descendants of animals which escaped from the early Spanish invaders. In Spain these fierce, almost untamable cattle are still bred for the barbarous sport witnessed in their bull-fighting arenas, where the animals are pitted against men on foot and on horse-back, until they are tortured to death.

The cattle of Texas, and the Southwestern plains possess at least one good quality in a high degree—they reproduce rapidly, and take care of

themselves at small expense to their owners. When well-fattened, their beef is excellent, and its abundance furnishes an unfailing supply of

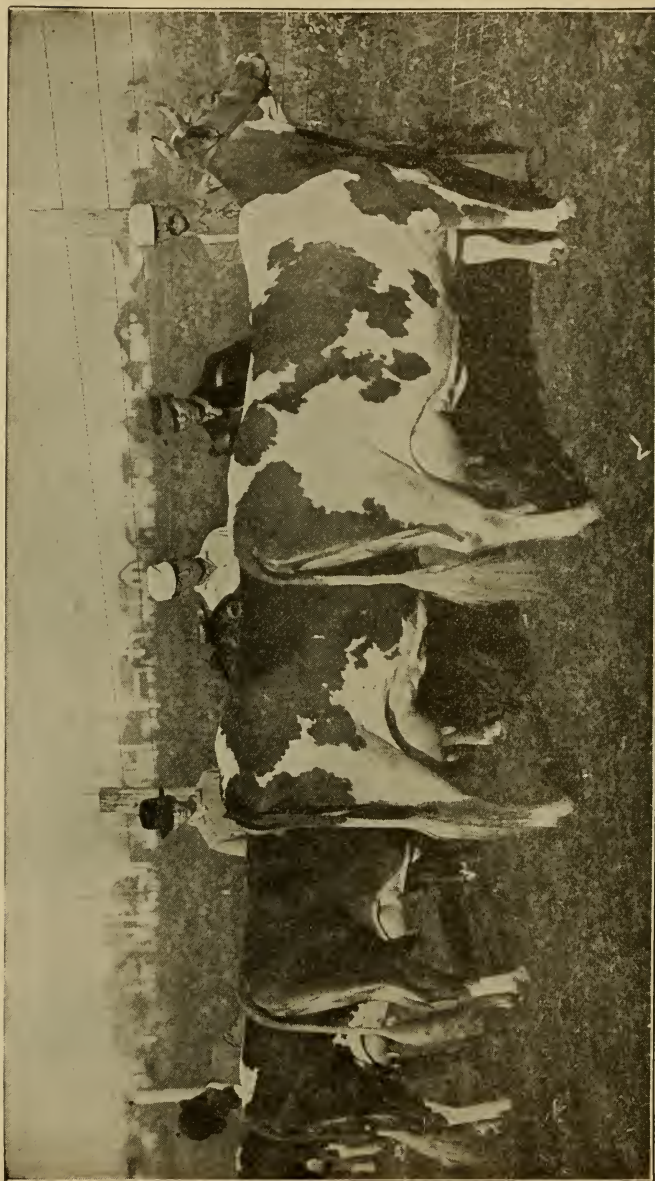


BRAZILIAN COW OF THE OLD NATIVE BREED.



MEXICAN OXEN.

cheap food. They are fast being modified by crossing improved stock upon them, and in a comparatively short time but few of the original



A LINE-UP OF GUERNSEY WINNERS AT THE NATIONAL DAIRY SHOW.

type will be found, except in Central and South America, where modifications of the ancient breed may be long postponed.

VI. The Devons.

Among the oldest of the distinct breeds of England, the Devons have always been, as they now are, one of distinguished merit. They belong to the class called Middle-Horns—Irish long-horned cattle, and the Texans furnishing good types of the long-horned breeds, while the old cattle of Durham represent the Short-Horns. The Devons, as known 100 years ago, are thus described by Youatt, whose writings are our best authority on breeds of British cattle: “The north of Devon has been long celebrated for a breed of cattle beautiful in the highest degree, and, in activity at work and aptitude to fatten, unrivaled. The native country of the Devons, and where they are found in a state of the greatest purity, extends from the river Taw westward, skirting along the Bristol channel; the breed becoming more mixed, and at length comparatively lost before we arrive at the Parrett. Inland it extends by Barnstaple, South Molton, and Chumleigh, as far as Tiverton, and thence to Wellington, where again the breed becomes unfrequent, or it is mixed before we reach Taunton. More eastward the Somersets and the Welsh mingle with it, or supersede it. To the south there prevails a larger variety, a cross probably of the Devon with the Somerset; and on the west the Cornish cattle are found, or contaminate the breed. The Devonshire man confines them within a narrow district, and will scarcely allow them to be found with purity beyond his native county. From Portlock to Biddeford, and a little to the north and the south, is, in his mind, the peculiar and only residence of the true Devon.

“From the earliest records the breed has here remained the same; or if not quite as perfect as at the present moment, yet altered in no essential point until within the last thirty years. This is not a little surprising when it is remembered that a considerable part of this district is not a breeding country, and that even a proportion, and that not a small one, of Devonshire cattle, are bred out of the county. On the borders of Somerset and Dorset, and partly in both, extending southward from Crewkern, the country assumes the form of an extensive valley, and principally supplies the Exeter market with calves. Those that are dropped in February and March, are kept until May, and then sold to the drovers, who convey them to Exeter. They are there purchased by the Devonshire farmers, who keep them for two or three years, when they are sold to the Somersetshire graziers, who fatten them for the London market; so that a portion of the Devons, and of the very finest of the breed, come from Somerset and Dorset.”

The illustration on page 601 will give an idea of the excellence of these cattle, even fifty years ago. Since that time they have been much improved and only lack size to cause them to be more generally bred in the great grazing districts of the United States.

VII. The Herefords.

The Herefords are Middle-Horns, and have many of the characteristics of the Devons to which they are, without doubt, allied. They have long been known and highly esteemed in England. Within the last thirty years they have been bred to such perfection that they compete with the Short-Horns in the prize fairs of England and the United States, and carry off honors with the best of them. Of this breed, as they were known in the early part of the century, Youatt says: "The Hereford white-faced breed, with the exception of a very few Alderney and Durham cows, have almost exclusive possession of the county of Hereford. The Hereford oxen are considerably larger than the Devons. They are usually of a darker red; some of them are brown, and even yellow, and a few are brindled; but they are principally distinguished by their white faces, throats and bellies. In a few the white extends to the shoulders. The old Herefords were brown or red-brown, with not a spot of white about them. It is only within the last fifty or sixty years that it has been the fashion to breed for white faces. Whatever may be thought of the change of color, the present breed is certainly far superior to the old one. The hide is considerably thicker than that of the Devon. Compared with the Devons, they are shorter in the leg, and also in the carcass; higher, and broader and heavier in the chine; rounder and wider across the hips, and better covered with fat; the thigh fuller and more muscular, and the shoulders larger and coarser.

"If it were not for the white face, and somewhat larger head and thicker neck, it would not at all times be easy to distinguish between a heavy Devon and a light Hereford. Their white faces may probably be traced to a cross with their not distant relations, the Montgomeries.

"The Hereford cow is apparently a very inferior animal. Not only is she no milker, but even her form has been sacrificed by the breeder. Hence the Hereford cow is comparatively small and delicate, and some would call her ill-made. She is very light-fleshed when in common condition, and beyond that, while she is breeding, she is not suffered to proceed; but when she is actually put up for fattening, she spreads out, and accumulates fat at a most extraordinary rate."

The illustration on page 605 is a good picture of the Hereford bull of forty years ago. The reader would scarcely recognize the Hereford of 1907 as the same breed described by Youatt, so much have they been improved.



HEREFORD BULL PRIME LAD.

VIII. The Durham or Teeswater Breed.

This breed, which has become famous as the original of the celebrated Short-Horn cattle of to-day, is a mixed race, though it has been a distinctive English breed of hundreds of years past. The Rev. Mr. Berry, author of a much-criticized history of Short-Horn cattle, written in the early part of the century, but undoubtedly correct in relation to their early history, says :

“From the earliest periods as to which we have any accounts of our breeds of cattle, the counties of Durham and York have been celebrated for their Short-Horns, but principally, in the first instance, on account of their reputation as extraordinary milkers. It may be the best evidence, that, as a breed, they have never in this particular been equaled. They were generally of large size, thin-skinned, sleek-haired, bad handlers, rather delicate in constitution, coarse in the offal, and strikingly defective in girth in the fore-quarters. When put to fatten, they were found slow feeders ; producing an inferior meat, not marbled or mixed fat and lean, and in some cases the lean was found a particularly dark hue.

“A period of more than one hundred years has now elapsed since the Short-Horns, on the banks of the river Tees, hence called the Teeswater breed, assumed a very different character to the foregoing description. In color, they resembled the Short-Horns of the present day, being occasionally red, red and white, and roan, though the last not then so prevalent as now. They possessed a fine mellow skin and flesh, good hair, and light offal, particularly wide carcasses, and fore-quarters of extraordinary depth and capacity. When slaughtered, their proof was extraordinary, and many instances are recorded of the wonderful weight of their inside fat.

“The remarkable merit which existed in the Teeswater may, with propriety, be ascribed to a spirit of improvement which had some time manifested itself among the breeders on the banks of the Tees, whose laudable efforts were well seconded by the very superior land in the vicinity of that river. No doubt can be entertained that they proceeded on a judicious system of crossing with other breeds, because it was utterly impossible to raise such a stock as the Teeswater from pure Short-Horn blood. One cross to which they referred was, in all probability, the white wild breed ; and if this conjecture be well-founded, it will be apparent whence the Short-Horns derived a color so prevalent among them.

“It is also asserted that, about the period in question, Sir William St. Quintin, of Scampston, imported bulls and cows from Holland, which were crossed with the stock of the country. It would tend to little advantage to conjecture as to what other breeds were resorted to, if any :



POLLED DURHAM HERD.
Specially photographed for this work.

this much is certain, that great improvement was soon manifested, and a valuable variety established."

An illustration of this valuable breed, as it was known fifty years ago, is given on page 539. It is to be regretted that the fine milking qualities of their descendants should have been almost entirely bred out, and are now only found occasionally, through heredity, and this in but a very few families.

IX. Irish Cattle.

The cattle of Ireland are of two distinctive breeds, the Long-Horns and the Middle-Horns. Whence the Long-Horns came seems not to be known, since ancient records are silent upon the subject. Both in England and Ireland they can be traced far back. By some excellent authorities it is maintained that the Long-Horns originated in Ireland; but in Lancashire, England, also, long-horned cattle have existed since a remote antiquity.

The Irish Middle-Horns seem to have been an original breed, since they were found in all the hill and mountain regions, in almost every district. Mr. Youatt says of them that they are small, light, active and wild. The head is small, although there are exceptions to this in various parts; and so numerous, indeed, are those exceptions, that some describe the native Irish cattle as having thick heads and necks; the horns are short compared with the other breed, all of them fine, some of them rather upright, and frequently, after projecting forward, then turning backward. Although somewhat deficient in the hind-quarters, they are high-boned, and wide over the hips, yet the bone generally is not heavy. The hair is coarse and long; they are black, brindled and black, or brindled with white faces. Some are finer in the bone, and finer in the neck, with a good eye, a sharp muzzle, and great activity. They are exceedingly hardy; they live through the winter, and sometimes fatten, on their native mountains and moors; and when removed to a better climate and soil, they fatten with all the rapidity of the aboriginal cattle of the Highlands and Wales. They are generally very good milkers, and many of them are excellent. The cow of Kerry is said to be a favorable specimen of them.

X. Scotch and Highland Cattle.

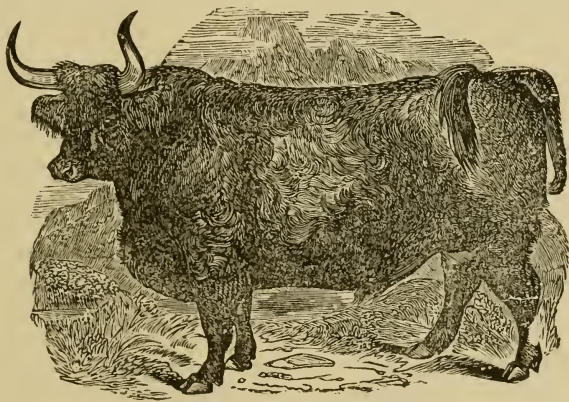
Scotland has always been celebrated for its cattle, and for none more than its polled or hornless cattle. The Highland breeds are of great antiquity. The most celebrated of the polled breeds are the Galloways, originally said to have been middle-horned cattle. They are widely disseminated in England and the United States, and in their improved forms are regarded with much favor. Many sub-families are now known.



IMPORTED WEST HIGHLAND CATTLE.

Prize Winners in England and America.—Specially photographed for this work.

They are described as having been straight and broad in the back, and nearly level from the head to the rump; round in the ribs, and also, between, the shoulders and ribs, and the ribs and loins. The loins were broad, and without large projecting hip (hook) bones. In the early part of the century they were described by the Rev. Mr. Smith, author of a "Survey of Galloway," as being short the leg, and moderately fine in the shank bones—the happy medium preserved in the leg, which secures hardihood and disposition to fatten. With the same cleanness and shortness of shanks, there was no breed so large and muscular above the knee. Clean, not fine and slender, but well proportioned in the neck and chaps; broad shoulders, deep chest, and close, compact form. The neck of the Galloway bull was, and still is, thick almost to a fault. The head rather heavy; the eyes not prominent, and the ears large, rough, and full of long hairs on the inside. The Galloway was covered with a loose mellow skin of medium thickness, clothed with long, soft, silky hair. The skin is thinner than that of the Leicestershire, but not so fine as the hide of the Short-Horn, but handling soft and kindly. The prevailing and fashionable color was black—a few dark brindle-brown, and still fewer speckled with white spots, and some of them a dun or drab color. Dark colors were, and are yet, uniformly preferred, from the belief that they indicate hardiness of constitution.



WEST HIGHLAND FEEDING OX.

Highland Cattle.—The West Highland cattle are an ancient breed and are found in all the mountain regions of Scotland and the Isles. Their great value consists in the eminent superiority of their flesh. They are hardy, and easily fed; in that they will live, and sometimes thrive, on the coarsest pastures: that they will frequently gain from a fourth to a

third of their original weight in six months' good feeding; that the proportion of offal is not greater than in the most improved larger breeds. They will lay their flesh and fat equably on the best parts; and, when fat, the beef is close and fine in the grain, highly flavored, and so well mixed or marbled, that it commands a superior price in every market.

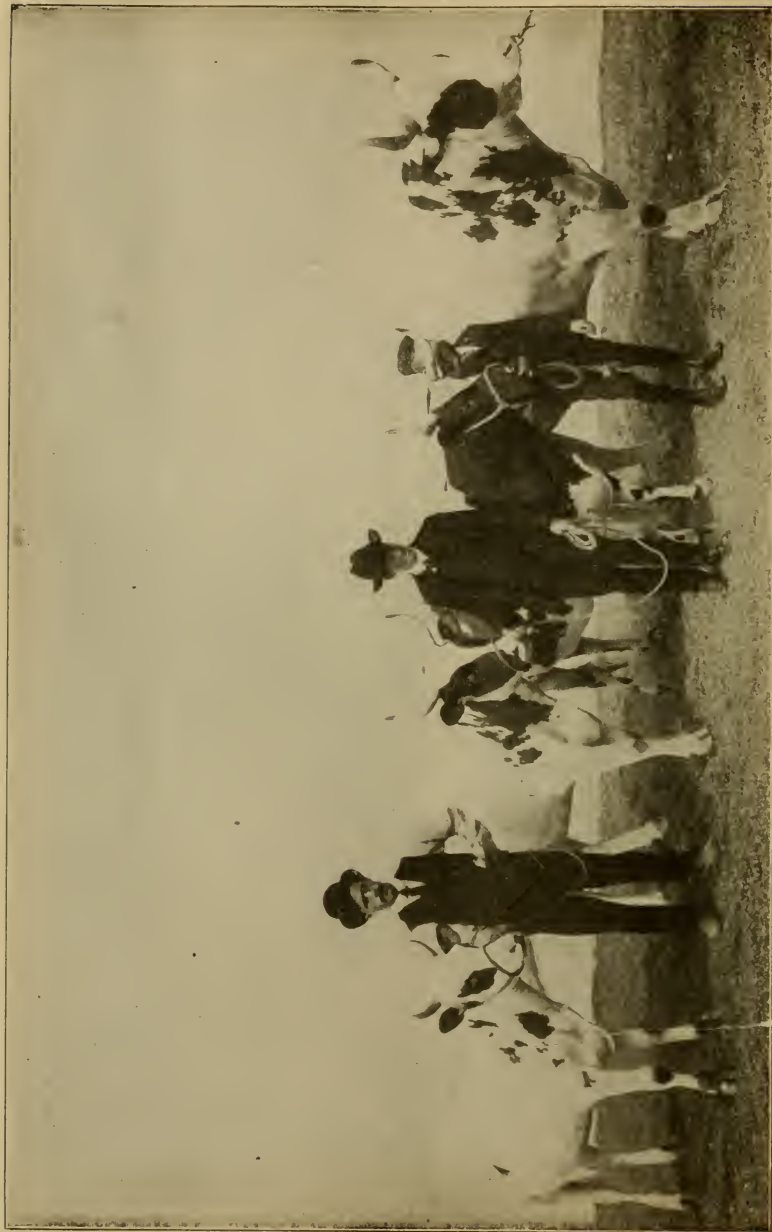
The principal old breeds of Scotland, as given by Youatt, may be summarized as follows: Scotland contains several distinct and valuable breeds of cattle, evidently belonging to our present division, the Middle-Horns. The West Highlanders, whether we regard those that are found in the Hebrides, or the county of Argyle, seem to retain the most of the aboriginal character. They have remained unchanged, or improved only by selection, for many generations; indeed from the earliest accounts that we possess of Scottish cattle. The North Highlanders are a smaller, coarser, and in every way inferior race, and owe the greater part of what is valuable about them to crosses from the Western breed. The Northeastern cattle were derived from, and bear resemblance to the West Highlander, but are of considerably larger size. The Ayrshire breed is second to none for milking. The Galloways, which less than two hundred years ago, were middle-horned, and with difficulty distinguished from the West Highlanders, are now a polled breed—increased in size, with more striking resemblance to their kindred, the Devons—with all their aptitude to fatten, and with a great hardness of constitution.

XI. Swiss Cattle.

The Swiss have long had a valuable breed of milking cattle which of late years has attracted some attention in the United States. In France they are held in high repute. A careful and accurate observer describes them as being robust, hardy animals, usually of a dun color or dun and white, with medium heads, hanging dewlaps, rather coarse shoulders and broad hips and quarters, with well developed udders. Removed from their native mountains they are said to manifest little impatience at the change, and though kept in stables and soiled, they seemed to thrive and carry a good coat of flesh; when dry, they fatten readily. In Switzerland they are wintered in the valleys, on the coarsest food, and as soon as the snow melts from the southern slopes of the mountains are driven to their pastures, which, as the season advances, are gradually changed for the higher ranges. For four months in the year they are kept on the most elevated feeding grounds, and there, attended by a single man, uniting in his person the offices of cowherd and dairyman, they feed on the close, sweet herbage, often at the very edge of the snow fields, till their short summer is over, and they are driven by the autumn storms to the more sheltered pastures again. Cheese is the chief product, and its



BROWN SWISS BULL.
Specially photographed for this work.



GROUP OF AYRESHIRE.

Specialty photographed for this work.

manufacture is conducted in the lonely chalet, perched on the mountain side, in the most primitive manner. The best cows yield from ten to twenty quarts of milk daily, and each cow produces by the end of the season of four months, on an average, 225 pounds of cheese.

XII. Dutch Cattle.

The Low Countries of Europe, Holland and the neighboring States, have, from a remote period, had a most valuable milking breed, that is now broken up into numerous varieties. The most noted of these are the Holstein or Friesian cattle, celebrated for the immense quantities of milk they give, and for their large frames, which take on fat and flesh kindly when dry. On page 690 a young Holstein bull of the modern Chenery milking stock is represented. The late Mr. Klippart, when Secretary of the Ohio Board of Agriculture, wrote from personal observation of Holstein cattle, as follows: "The native cattle of Holstein are the Angle cattle, which are far more numerous than any other kind or race. They are small animals, with fine bones, short-legged rather than otherwise: a very fine, small head, and delicately formed neck. The prevailing color is red or brown, but there are many dun, black, or spotted ones. According to the amount of food consumed, this race gives a more abundant supply of milk than any other in the Duchies. It is a very highly esteemed race and is much sought after for its milking qualities and kindliness in taking on flesh. The flesh is very fine, tender and juicy.

"In the marshes is found a race of cattle much larger and heavier than the Angles, larger-boned, and of a dark, reddish-brown, and known as the Marsh race. This race seems to be adapted to the marshes, but does not do well on the higher and dryer uplands. Upon the rich pastures of the marshes, for a time after calving, the best cows will give from forty-eight to sixty-four pounds, (from six to eight gallons) of milk daily. But the milk is not near so rich as that of the Angles.

"In Schleswig, rather than in Holstein, are found many of the Jutland race of cattle. These have very fine bones, and are long in proportion to their height, and are, as a rule, short-legged. The prevailing color is gray, black, or gray and black mixed with white, but very rarely red or brown. This race is more highly esteemed for its early maturity and readiness to fatten than for its milking qualities."

XIII. Fossil Cattle.

The original type of the modern ox is said to have been the Urus. Ancient legends have thrown around him mysterious qualities. He was described as being an animal of great fierceness and enormous size; but despite these fabled attributes, the Urus probably did not

compare better in size with the modern ox, than did the ancient horse, or our modern semi-wild horses, with the great draft horse of to-day.

That there once existed species of cattle in some pre-historic age, monstrous as compared with ours, there is no doubt. Youatt, in his history of British cattle, says that in almost every part of the Continent, and in every district of England, skulls, evidently belonging to cattle, have been found, far exceeding in bulk any now known. There is a fine specimen in the British Museum: the peculiarity of the horns, resembles smaller ones dug up in the mines of Cornwall. The two plates given illustrate two remains of fossil skulls, of prehistoric times, gigantic in structure; that of *Primagenius* supposed to have been of a species from which our modern cattle have descended.

XIV. The Wild Cattle of England.

Of the wild cattle kept in England on the estates of the Duke of Hamilton, and the Earl of Tankerville, known in his day, the same authority says :

“The wild breed, from being untamable, can only be kept within walls, or good fences ; consequently, very few of them are now to be met with, except in the parks of some gentlemen, who keep them for ornament, and as a curiosity. Their color is invariably white, muzzle black ; the whole of the inside of the ear, and about one-third of the outside, from the tips downward, red ; horns, white, with black tips, very fine, and bent upward ; some of the bulls have a thin, upright mane, about an inch and a half or two inches long. The weight of the oxen is from thirty-five to forty-five stone, and the cows from twenty-five to thirty-five stone, the four quarters (fourteen pound to the stone). The beef is finely marbled and of excellent flavor. The six year old oxen are generally very good beef ; whence it may be fairly supposed that, in proper situations, they would feed well.

“At the first appearance of any person they set off in full gallop, and, at the distance of about two hundred yards, make a wheel round, and come boldly up again in a menacing manner ; on a sudden they make a full stop at the distance of forty or fifty yards, looking wildly at the object of their surprise ; but upon the least motion they all again turn round, and fly off with equal speed, but not to the same distance, forming a shorter circle, and again returning with a more threatening aspect than before ; they approach probably within thirty yards, when they again make another stand, and then fly off ; this they do several times, shortening their distance, and advancing nearer and nearer, till they come within such a short distance that most people think it prudent to leave them.

When the cows calve, they hide their calves for a week or ten days in some sequestered situation, and go and suckle them two or three times a day. If any person comes near the calves, they clap their heads close to the ground, to hide themselves; this is a proof of their native wildness. The dams allow no person to touch their calves, without attacking them with impetuous ferocity. When any one happens to be wounded, or is grown weak and feeble through age or sickness, the rest of the herd set on it and gore it to death."

The breeds now found in Great Britain, are almost as various as the soils of the different districts, and are purely artificial in their breeding, according to the several fancies of the originators, and successive breeders.

XV. Native Districts of Some Breeds.

The same careful authority, heretofore quoted, has divided them into Long-Horns, Short-Horns and Middle-Horns. Their history, which may be taken as correct, their classification, and their habits, as known in his day, are given as follows: "The Long-Horns were originally from Lancashire, much improved by Bakewell, and established through the greater part of the midland counties; the Short-Horns, mostly cultivated in the northern counties, and in Lincolnshire, and many of them found in every part of the kingdom where the farmer attends much to his dairy, or a large supply of milk is wanted; and the Middle-Horns, not derived from a mixture of the two preceding, but a distinct and valuable and beautiful breed, inhabiting principally the north of Devon, the east of Sussex, Herefordshire, and Gloucestershire; and, of diminished bulk, and with somewhat different character, the cattle of the Scottish and the Welsh mountains. The Alderney, with her crumpled horn, is found on the southern coast, and, in smaller numbers, in gentlemen's parks and pleasure-grounds every where; while the polled, or hornless cattle, prevail in Suffolk, and Norfolk, and in Galloway, whence they were first derived.

"These, however, have been intermingled in every possible way. They are found pure only in their native districts, or on the estates of some opulent and spirited individuals. Each county has its own mongrel breed, often difficult to be described, and not always to be traced—neglected enough, yet suited to the soil and to the climate; and, among little farmers, maintaining their station, in spite of attempts at improvements by the intermixture or the substitution of foreign varieties.

"The character of each important variety, and the relative value of each for breeding, grazing, the dairy, or the plough, will be considered before we inquire into the structure or general and medical treatment of cattle. Much dispute has arisen as to the original breed of British cattle.

The battle has been stoutly fought between the advocates of the Middle and Long-Horns. The Short-Horns and the polls can have no claim; the latter, although it has existed in certain districts from time immemorial, was probably an accidental variety. We are very much disposed to adjudge the honor to the Middle-Horns. The Long-Horns are evidently of Irish extraction.

“Britain has shared the fate of other nations, and oftener than they, has been overrun and subjugated by invaders. As the natives retreated, they carried with them some portion of their property, which in those early times, consisted principally in cattle. They drove along with them as many as they could, when they retired to the fortresses of north Devon and Cornwall, or the mountainous regions of Wales, or when they took refuge in the wealds of east Sussex; and there, retaining all their prejudices, customs and manners, were jealous of the preservation of that which reminded them of their native country before it yielded to a foreign yoke.

“In this manner was preserved the ancient breed of British cattle. Difference of climate wrought some change, particularly in their bulk. The rich pasture of Sussex fattened the ox into its superior size and weight. The plentiful, but not so luxuriant, herbage of the north of Devon, produced a smaller and more active animal, while the privations of Wales lessened the bulk and thickened the hide of the Welsh runt. As for Scotland, it set its invaders at defiance; or its inhabitants retreated for a while, and soon turned again on their pursuers. They were proud of their country, their cattle, their choicest possession; and there, too, the cattle were preserved, unmixed and undegenerated,

“Thence it resulted that in Devon, in Sussex, in Wales, and in Scotland, the cattle have been the same from time immemorial; while in all the eastern coast, and through every district of England, the breed of cattle degenerated, or lost its original character; it consisted of animals brought from every neighboring and some remote districts, mingled in every possible variety, yet conforming itself to the soil and the climate.

“Observations will convince us that the cattle in Devonshire, Sussex, Wales and Scotland, are essentially the same. They are middle-horned; not extraordinary milkers, and remarkable for the quality rather than the quantity of their milk; active at work, and with an unequalled aptitude to fatten. They have all the characters of the same breed, changed by soil, climate, and time, yet little changed by man. We may almost trace the color, namely, the red of the Devon, the Sussex, and the Hereford; and where the black alone are now found, the memory of the red prevails. Every one who has compared the Devon cattle with the wild breed of Chatelherault park, or Chillingham castle, has been struck with the



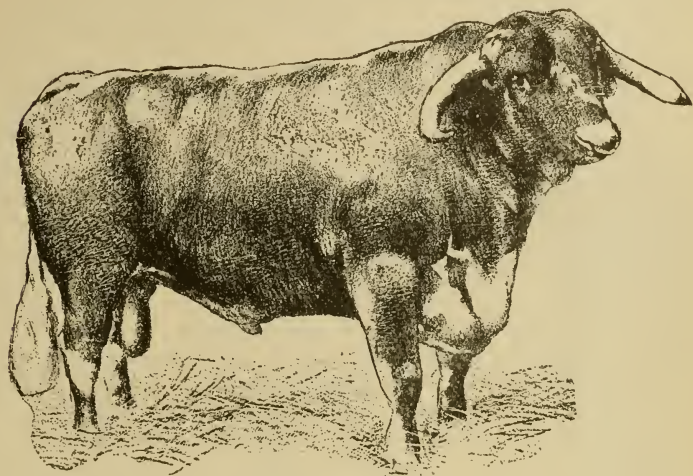
AYRSHIRE CATTLE.

Specially photographed for this work.

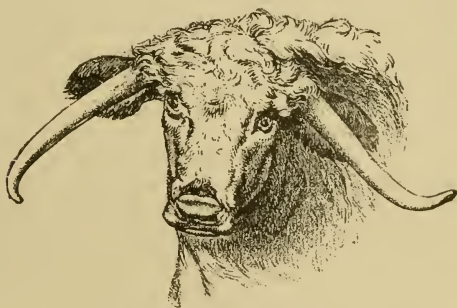


GROUP YOUNG GALLOWAY STEERS.
Specially photographed for this work.

great resemblance in many points, notwithstanding the difference of color, while they bear no likeness at all to the cattle of the neighboring country."



LONGHORN BULL.



HEAD OF LONGHORN COW.

The horns of this breed of cattle grow in such a manner as to be very distinctive. They curve forward, and hang down toward the muzzle, sometimes curving inward until they touch the cheek. The colors of the animal are generally dark red, brindled, and pied, with white along the backs. The females are very broad in the hips and are good milkers. One hundred years ago these cattle were more highly esteemed in England than any other breeds, because they were supposed to be the most desirable for dairy purposes; but they have been superseded by the shorthorns, although many of the latter have a strain of their more ancient predecessors.

For these reasons Mr. Youatt considers the Middle-Horns to be the native breed of Great Britain.

CHAPTER II.

STRUCTURE OF THE OX.

I. COMPARATIVE DESCRIPTION.—II. A GOOD COW DESCRIBED IN VERSE.—III. SKELETON OF THE OX.—IV. ANALYSING THE HEAD.—V. EXTERNAL PARTS OF A FAT OX.—VI. TEETH OF THE OX.—VII. AGE OF CATTLE TOLD BY THE CHART.

I. Comparative Description.

The ox, like the horse, is made up of a bony structure, upon which rests the muscular and fleshy covering, and over this again lies the skin. The only means of defense possessed by cattle are their horns, which, in breeds that have been running wild for generations, develop into long sharp, and most formidable weapons. These are most securely fixed and rendered effective by the expanse of the frontal bone, shown at numeral 6, skeleton of the ox, as represented in the cut accompanying this chapter.

The horse is long in the limbs and neck; the ox is comparatively short in these members. The body of the horse corresponds to the square; that of the ox to the rectangle. The illustrations showing outlines of fat bullocks, as presented a few pages further on in this chapter—four forms exhibited—are accurate representations. The ribs of the ox are both longer and larger than those of the horse, since the several stomachs and the bowels of the ox are more capacious. The width of the bosom gives ample space for the fore legs and for the viscera; and this width is carried correspondingly behind, giving, in the modern ox, a broad loin and massive rump and hind quarters, where the choice parts of the beef lie.

II. A good Cow described in verse.

The physical proportions of the cow have been so accurately described in verse, by an old English writer, that we reproduce his stanzas as embodying the general characteristics of what goes to make up a perfect animal:

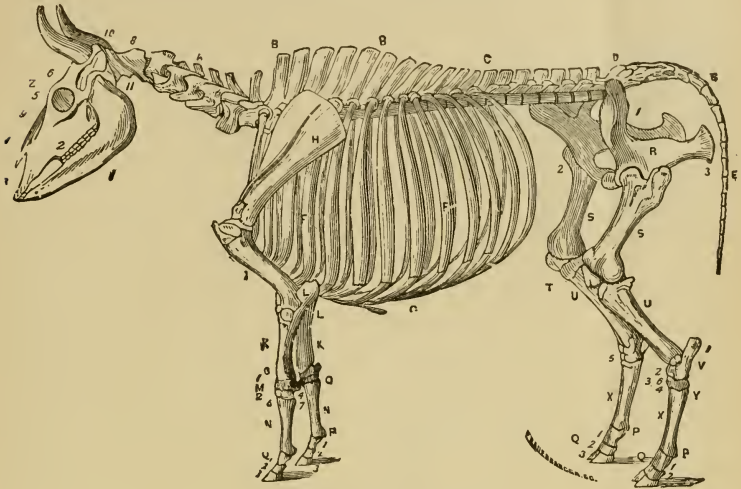
She's long in her face, she's fine in her horn,
She'll quickly get fat without cake or corn;
She's clean in her jaws, and full in her chine,
She's heavy in flank, and wide in her loin.

She's broad in her ribs, and long in her rump;
A straight and flat back, without e'er a hump;
She's wide in her hips, and calm in her eyes;
She's fine in her shoulders, and thin in her thighs.

She's light in her neck, and small in her tail;
She's wide in her breast, and good at the pail;
She's fine in her bone, and silky of skin—
She's a grazier's without, and a butcher's within.

III. Skeleton of the Ox.

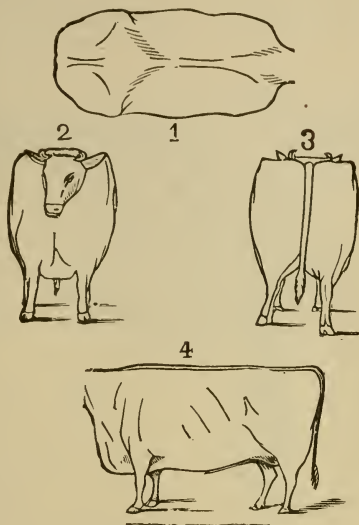
If we look at the skeleton of the ox we shall there see the basis of the immense but sluggish strength for which this animal is noted. It will not be necessary to translate the names of the bones. They should be called by the scientific names here given. The corresponding bones found in the horse have been sufficiently explained.



SKELETON OF THE OX.

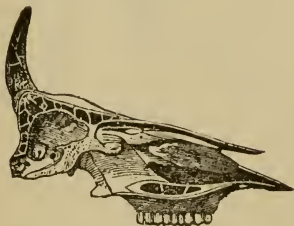
Names of the Bones.—*A A*—Cervical Vertebrae. *B B*—Dorsal Vertebrae. *C*—Lumbar Vertebrae. *D*—Sacrum. *E E*—Coccygeal Bones. *F F*—Ribs. *G*—Costal Cartilages. *H*—Scapula. *I*—Humerus. *K K*—Radius. *L*—Ulna. *M*—Carpus or Knee. 1—Scaphoid. 2—Semilunar. 3—Cuneiform. 4—Trapezium. 5—Trapezoid. 6—Os Magnum. 7—Unciform. 8—Pisiform. *N N*—Large Metacarpal or Cannon. *O*—Small Metacarpal. *P P*—Sesamoid Bones. *Q Q*—Phalanges. 1—Os Suffraginis or Pastern Bone. 2—Os Coronæ. 3—Os Pedis. *R*—Pelvis. 1—Illium. 2—Pubis. 3—Ischium. *S*—Femur. *T*—Patella. *U*—Tibia. *V*—Fibula. *W*—Hocks. 1—Os Calcis. 2—Ostragalus. 3—Cuneiform Magnum. 4—Cuneiform Medium. 5—Cuneiform Parvum. 6—Cuboid. *X*—Large Metatarsal. 1, 2, 3—Phalanges. *Y*—Small Metatarsal. *Z*—Head. 1—Inferior Maxilla. 2—Superior Maxilla. 3—Anterior Maxilla. 4—Nasal Bone. 5—Molar. 6—Frontal. 7—Parietal. 8—Occipital. 9—Lachrymal. 10—Squamous. 11—Petrus.

Elegance, speed, and muscular activity are the qualities for which the frame-work of the horse seem best suited. In the ox there is also the beauty of symmetry as shown in smooth lines, when fat, and the development of great strength with slow motion. Hence, the limbs are straighter and more massive than in the horse.



OUTLINE OF FAT BULLOCKS.

In the ox we find the same two plates at the top of the head, that were noticed in the horse. In the ox and other horned animals these



VERTICAL SECTION OF THE HEAD.

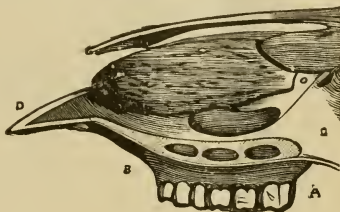
plates have a considerable space between them, as shown in the accompanying cut giving a vertical section of the head. This space is filled with cells having bony ridges passing from the inner to the outer plate, or table, securing firmness; and these cells form large and strong sockets for the horns. The cavity of the brain is, in the ox, about one-fourth the size of the skull—the other parts being occupied by the organs of smell, the teeth and the jaws, which are exhibited in vertical sections here given.

IV. Analysing the Head.

The second cut representing a section of the head of an ox, reveals a portion of the upper jaw, showing the molars, or grinding teeth.

Explanation.—*A*—Molars or grinders. *B*—Superior maxillary bone and its palatine process. *C*—Cells of the palatine bone. *D*—Anterior maxillary bone, destitute of incisor teeth.

The frontal bones shown at 6 in the skeleton of the ox, extend from the nose to the superior ridge of the skull, presenting a flat, irregular surface, quite bare of fleshy or muscular covering. The ox has the same division in the center of the frontal sinuses as the horse, but the division between the nostrils is not perfect. There is a continuous cavity from the muzzle to the horn. In polled or horned cattle the frontal bones reach from the nasal bones to



SECTION OF HEAD OF OX.

the parietal ridge, but since there are no horns, these bones become narrower towards the poll. In cattle the temporal bones are small, but deep in the temporal fossa and have no squamous structure. The occipital bone has little importance by comparison with its use in the horse. The sphenoid and ethmoid bones relatively occupy the same position in the two animals. A comparison of the skeletons of the horse and ox, will fully illustrate this.

V. External Parts of a Fat Ox.

As beef is a universal article of food, the value of a very large proportion of the cattle reared is determined by their capacity to develop juicy, palatable meat. The illustration on the next page shows a Short-Horn ox in prime condition, and the accompanying explanation points out the several parts of the animal with reference, mainly, to their qualities and use as beef.

Where the choice Beef lies.—The prime parts of the ox, as shown in the cut, lie from *N* to *R*, and from *R* to *S*, and back to *N*. Between *P*, *Q* and *V* are the best pieces. The second best are between *M*, *S*, *T*, *V*, *W* and *K*. Between *S* and *U* are valuable pieces for smoked or dried meat. The ribs between *M* and *S*; the flanks *V*, *W*, and thence to the brisket *K* are good corning pieces. The quarters of such an ox will dress sixty-five per cent. of his gross weight. The loin above *P* and from thence to the top of the shoulder above *N* will give superior steak and roasting pieces. The shoulder-point or neck vein back of *T* and thigh at *S* make the best smoking-pieces. The plates *W* will make

excellent corned beef, while *R*, *S* and *L* (the rump, round and brisket) make the best pieces for pickling—good, thick, juicy meat, and in large quantities.



SHORT HORN OX IN PRIME CONDITION.

Explanation.—*A*—Forehead. *B*—Face. *C*—Cheek. *D*—Muzzle. *E*—Neck. *F*—Neck-vein. *G*—Shoulder-point. *H*—Arm. *I*—Gambrel or hock. *K*—Elbow. *L*—Brisket, bosom or breast. *N*—Crops. *O*—Loin. *P*—Hip. *Q*—Rump. *R*—Pin-bone. *S*—Round-bone, thurl or whirl. *T*—Buttock. *U*—Thigh, or gasket. *V*—Flank. *W*—Plates. *X*—Back, or chine. *Y*—Throat.

VI. Teeth of the Ox.

The ox has 32 teeth. These are divided into 24 grinding or molar teeth, six on each side of each upper and lower jaw, and 8 nippers or cutting teeth (incisors) in the front lower jaw. The ox has no canine teeth (tusks,) and no teeth in the front part of the upper jaw. In place of the front upper incisors, those of the lower jaw meet against a callosity above, thick, hard and, in old cattle, almost horny. Scientifically the teeth are represented by the following Dental formula:

Genus Bos. Cattle; incisors, $\frac{2}{1}$, canines, $\frac{0}{0}$, molars, $\frac{6}{6}$. = Total, 32 teeth.

But in order that the reader may judge accurately of the age of any animal of the genus *Bos*, but especially the age of cattle, a chart is annexed, showing the nippers, (incisors,) from birth up to the age of five years past—that is, up to the sixth year; and also the teeth as they appear at ten years of age.

An ox at five years old, is past his prime for beef, and at six is past his prime for economical farm labor, except at heavy, slow draft. The cow will breed good calves from three years to the age of ten years, and often up to fifteen years. The bull should be sure in his get, up to about the age of eight years, after which he usually gets logy.

VII. Age of Cattle told by the Chart.

The age of cattle is only told by the horns and the teeth. The horns will show the age with reasonable accuracy up to the age of six years, by means of the annual rings, and tolerably well up to the age of ten, unless they have been filed, sand-papered and oiled to deceive. As the animal gets older, the annual rings, or wrinkles, of the horns become confused by growing together.

Mr. Youatt, in his analysis of the teeth of the ox, gives six years as the age at which the animal attains the full mouth, such as we have shown at five years past. In his day, cattle were slower in maturing than now, and they were certainly kept in service to a greater age. If the animal is badly kept during the winter, and is turned upon insufficient pasture in summer, development will, of course, be slower. After the teeth are mature, if the pasture is short and gritty, they will be worn away faster.

The rules we give for determining the ages of modern cattle apply to well-kept, early-developing animals. Woods-cattle, those raised in the timber on scant fare, might present the same appearance at six years old that we have shown for five years past. In studying the chart, therefore, allowance must be made for the contingencies we have named. A reference to the chart will show that at birth there are but two central teeth, figure 1; at two weeks the calf will have four teeth, figure 2; at three weeks it will have six teeth, figure 3; at a month old the jaw will con-

tain eight incisors, and present the appearance as in figure 4. The mouth is then called full, as containing the ultimate number of incisors. These are not permanent, but temporary, or milk teeth, as they are called. At six to eight months old the central teeth begin to be worn, and show smaller than the others, see figure 5. At ten months absorption and the widening of the jaw will have carried the two central teeth still farther away from each other, and two other teeth, one on each side, will have begun to diminish, in fact will have distinct spaces between them, see figure 6. At twelve months absorption will have continued to two more teeth, leaving intact only the two outside teeth, see figure 7. At fifteen months the whole of the teeth will present the appearance as seen in figure 8. At this time the true or permanent teeth will have been growing in the jaw, between and back of the milk teeth. Figure 9 shows the appearance at fifteen months of age, the two permanent central teeth appearing in the place of the two first milk teeth which have disappeared, and the other permanent teeth are shown in their several stages of growth. Figures 10, 11 and 12 show the teeth at two, three and four years past. At the age of five years the animal will have a full mouth, as shown in figure 13, and at ten years the incisors will present the appearance as in figure 14.

Thus any person by the use of the chart, and by examination of the teeth of cows, of ages known to correspond therewith, may easily become an accurate judge of the age of cattle up to the age of four years. In the four-year-old mouth, the two central pairs of teeth are beginning to be worn down to the edges, and in a flat direction, or inclining slightly to the inside; yet the animal has not a full mouth—that is, the incisors are not fully up until it is five years old. See figure 14.

At five years old the teeth are fully grown, and the peculiar mark on the teeth, called the cup, is shown in all. At the same time all will have become flattened, while on the two center ones there begins to be a distinct darker line in the middle, bounded by a line of harder bone. From this time on we may depend both on the incisors and the grinders. At six years old the animal will have acquired the last grinding tooth. This is the sixth molar and is, from the beginning, a permanent tooth. From this time until the eighth year, and indeed thereafter, in determining the age of the animal, the nature of the soil upon which it has been fed must be taken into account. Gritty, close-fed pastures will wear them faster, and flush pastures slower. Thus in all the pasture regions of the West, and Southwest, the wear will be light. As a general rule, but admitting of many exceptions, at seven years old this line is becoming broader and more irregular in all of the teeth; and a second and broader, and more circular mark appears within the center of the former one, the most

distinct in the central, or two central pairs—and which, at eight years, has spread over the six central incisors.

At eight years, a change takes place which cannot be mistaken. The process of absorption has again commenced in the central incisors; it is slow, and is never carried to the extent seen in the milk teeth, but is sufficiently plain, and the two central teeth are evidently smaller than their neighbors. A considerable change has also taken place on the surface of the teeth; the two dark marks are worn into one in all but the corner teeth.



HOLSTEIN-FRIESIAN COW, SEGIS INKA.

At ten years old the four central incisors are diminished in size, and the mark is becoming smaller and fainter, as shown in figure 14. At eleven years the six central incisors are smaller, and, at twelve, all of them are very considerably diminished; but not to the same extent as in the young animal. The mark is now nearly obliterated, except in the corner teeth, and the inside edge is worn down to the gum.

From the age of twelve years and onward, the teeth diminish more and more, so that the animal cannot properly gather or grind the food. There are many instances, however, of cows breeding, and remaining good milkers, up to twenty years of age and over. But in this day of early development, no careful farmer will keep a cow breeding after the age of twelve years, except, perhaps, in the case of some extraordinary milker, or an exceptional cow, of great physical powers, and excellent breeding qualities, whose stock it may be desirable to perpetuate.

CHAPTER III.

DEVELOPMENT AND IMPROVEMENT OF BREEDS.

3. ANCIENT AND MODERN BREEDING.—II. CATTLE OF THE CAMPAGNAS.—III. PIONEERS OF IMPROVED STOCK.—IV. ILLUSTRATIONS OF NOTED ENGLISH BREEDS.—V. DO NOT ATTEMPT TO FORM A BREED.—VI. HOW A BREED IS FORMED.—VII. BREEDING FOR CERTAIN USES.—VIII. VARIATION IN TYPE.—IX. IN-AND-IN BREEDING AND BREEDING IN LINE.—X. ALTERING THE CHARACTER BY CROSSING.—XI. INFLUENCE OF SHELTER AND FEEDING.—XII. HEREDITY IN CATTLE.—XIII. HEREDITARY INFLUENCE OF PARENTS.—XIV. ATAVISM.—XV. PECULIARITIES OF ANCESTORS PERPETUATED.—XVI. HOW THE SHORT-HORNS WERE BRED UP.—XVII. SHORT-HORNS DURING THE LAST FIFTY YEARS.—XVIII. THREE SHORT-HORN STRAINS.—XIX. THE THREE PRINCIPAL TYPES OF CATTLE.

Ancient and Modern Breeding.

It might be curious to trace the history of cattle, step by step, in their improvement from the earliest times; but the results of such a task would be largely composed of conjecture, neither valuable as history, nor interesting, except to a few. The aim of this work is to be practical, and its object is to give only such valuable information as will be useful or interesting to all readers engaged in the breeding, rearing or use of live-stock.

While many distinct breeds of cattle have been known from the beginning of the historical era, it is only within the last 200 years that careful and systematic breeding has been resorted to. And it is probable, or, rather, it is positively true, that during the last fifty years greater results in the breeding of all farm animals have been accomplished, and greater progress towards perfection have been made, than in all the time before.

Jacob was the first systematic breeder of whom we have any record. It is tolerably certain that he understood something of the principles of mating cattle, else he could not have produced pied and other parti-colored animals in such numbers as to have assured him large profits and increase in the herds of his father-in-law. But Jacob's plan consisted simply in bringing together cows and bulls of certain different colors, with a view to securing a commingling of these colors, in the offspring. It does not appear that he made any systematic attempt to improve, by breeding, the qualities of his animals as milkers, draft oxen, or beef cattle. The results of such efforts, if they had ever been made, would as certainly have been noticed as the extensive production of "ring-streaked and speckled cattle."

II. Cattle of the Campagnas.

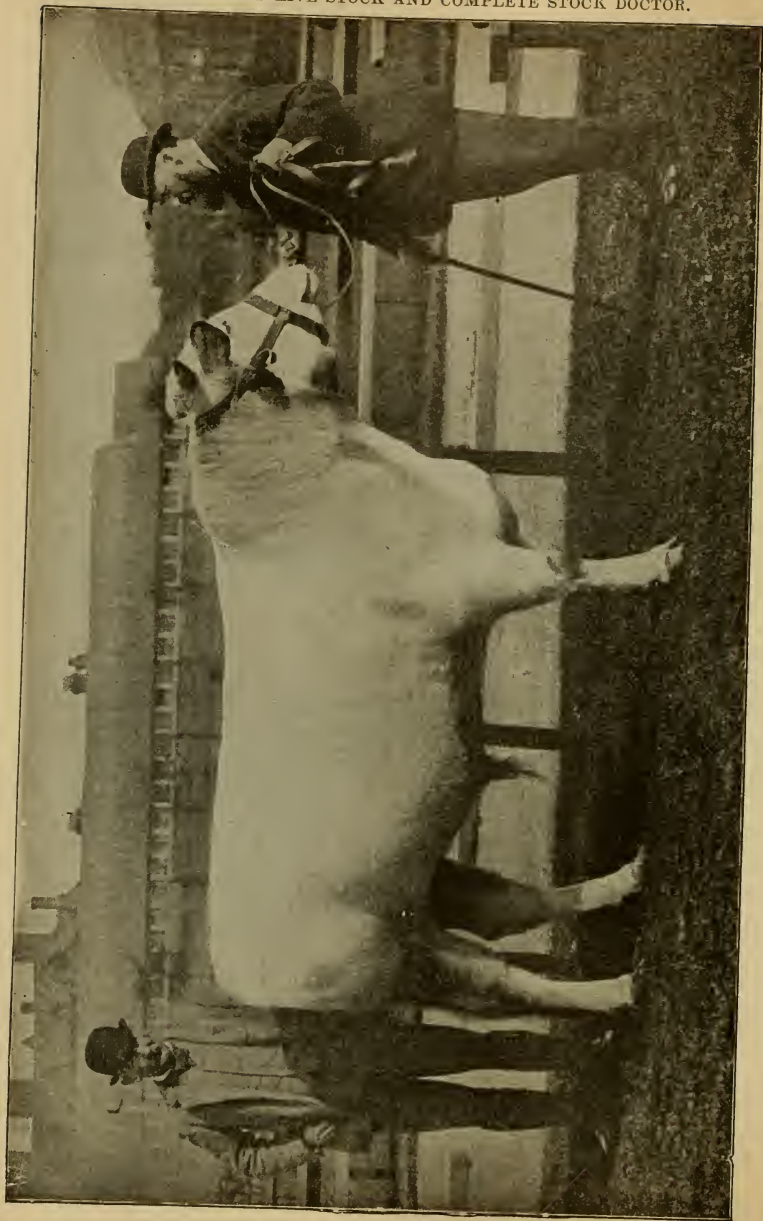
We have already spoken of the once-famous cattle of the Campagnas, in the time of the Romans. Their excellence was probably due more to



JERSEY COW GAIL RIVERS.



ABERDEEN-ANGUS BULL DELAMERE.



SHORT-HORN BULL, "GIPSY KING."

the kindness of the climate and the natural abundance of the pastures around Rome, than to any systematic endeavors to perpetuate good qualities, except by the simple rules of natural selection. The same is true of other ancient peoples whose cattle were once held in high repute. Abundant pasturage, extensive ranges and a genial climate were the important factors in the production of their superior stock, which, in all probability, was not much superior to the half-wild cattle herded upon our great western plains.

During the dark ages which succeeded the fall of the Roman Empire, agriculture degenerated with the arts, and, until about the sixteenth century, little attention was paid to the breeding of cattle, except by a primitive sort of selection, and by keeping certain strains of cattle confined to given sections of country.

III. Pioneers of Improved Stock.

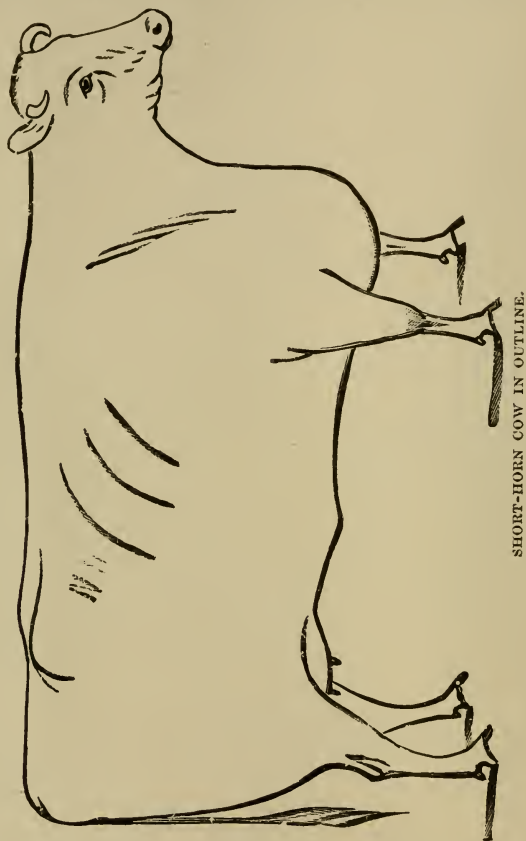
But little had been done in a systematic way to improve British cattle until Bakewell improved the Long-Horns. Subsequently the Collings bred up the Durhams or Teeswaters, and later breeders developed the Devons, to which the Sussex and Hereford breeds owe some of their most eminent qualities. The celebrity of the improved Leicesters ceased soon after the death of Bakewell. But the Short-Horns had then already become famous, and at the present day there is no other breed of beef cattle that combines so many good qualities, except the Herefords. And this noble breed, it must be confessed, is the peer of the Short-Horns in every respect, except perhaps early maturity, while in butchers' proof, it is probably superior to the Short-Horns. On the butchers' block, however, both the Short-Horns and the Herefords must yield precedence to the Devons, and the Devons again to the West Highland cattle of Scotland.

IV. Illustrations of Noted English Breeds.

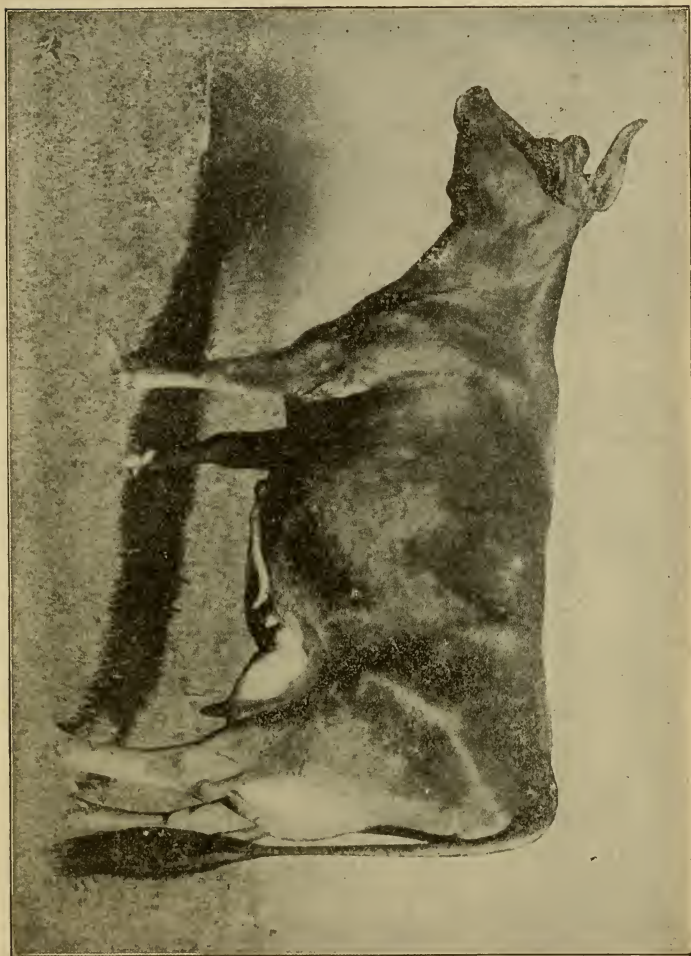
That the reader may become familiarized with noted English breeds of cattle, for beef, for labor, and for milking, we give on page 720 a model of the Sussex cow; on page 632 a Short-Horn cow in outline; and on page 642 an improved Hereford Bull, allied to the Sussex. On Page 715 a Norman cow is represented; and on page 682 a Jersey cow. On page 607 will be found a group of Derhams as they were known fifty years ago. With the descriptions of the various popular breeds, as they will be noticed hereafter, illustrations will be given showing their characteristics. The comparisons will be found a valuable study to all who make the breeding of cattle a part of their farm economy.

Do not Attempt to Form a Breed.

In the breeding of cattle do not attempt to form a new breed out of incongruous materials, such as you may happen to find near you. Good feeding, good shelter, and careful selection, will do much for any breed,



but to undertake to form a new breed can only end in failure. It will be found infinitely cheaper to take one of the breeds already formed, according to the use for which the animals are intended, than, by crossing and breeding up, to form one that at the end of one hundred years will be no better than some of the now-existing herds, and, perhaps, not as good. If there is any improvement to be made, make it on the model of the best of the more reputable breeds. For instance, the Short-Horns can



JERSEY COW FINANCIAL COUNTESS

As she appeared at the close of her test for one year, yielding 13,248 lbs. of milk, 795 lbs. 4.6 oz. butter-fat, 935 lbs. 10 oz. butter, 85 per cent fat, and actual churned butter 934 lbs. 13 oz.

easily be bred back to the milking quality by selecting the proper families; for they once possessed this quality in an eminent degree. If you wish to improve your common stock, do it by crossing upon the best of your common cows good, staunch, vigorous bulls, of the breed conforming to the type of cattle you wish to attain. The first cross will give you half-bloods; the second three-quarters blood; the third cross seven-eighths blood, and the fourth cross—fifteen-sixteenths blood. These latter, and, even the seven-eighths bred cattle, are, for all practical purposes, of beef, labor or milk, essentially as good as those purely bred. But it is necessary that pure and thoroughbred stock be kept intact, by every possible precaution, since they are the source from which all excellence is bred. Therefore, if you are able to breed the best, let all others alone. And there are so many cattle of pure and thoroughbred stock now, that such sires are not difficult to obtain, unless you wish to breed the very highest caste, and this, too, from a purely fanciful standpoint.

VI. How a Breed is Formed.

A breed is a variety. In plants a new variety of a species is produced by crossing one variety on another. In the case of crossing two species of the genus, to produce a hybrid, the fertility is generally destroyed, and the hybrid cannot be perpetuated. In crossing two animals or plants of the same species, but differing one from the other, the product is fertile, though not in so great a degree as in animals or plants of a like kind. The descendants will partake more strongly of one parent than the other, and these variations, in some cases, crop out after generations.

This atavism or striking back to some remote ancestor is not infrequent in the Short-Horns, notwithstanding the extreme care taken in breeding, and the many years that have passed since the particular cross was made. On the other hand, the Devons breed constant to type, or nearly so. Hence, the Devons are called a pure breed, and the Short-Horns are called thoroughbred. The Herefords also retain this constancy in general character to a remarkable degree, for the reason that they are an original breed, and not, like the Short-Horns, and racing horses, made up of a mixed lineage, and developed within a comparatively short time. Thus the reader will see the force of the advice, "Do not attempt to form a new breed."

VII. Breeding for certain uses.

For present practical purpose let your sires be the best you can afford, of some improved breed, which should be chosen with reference to the purpose for which the offspring is intended. For beef and early maturity choose a Short-Horn or Hereford bull. If you breed for beef and labor,

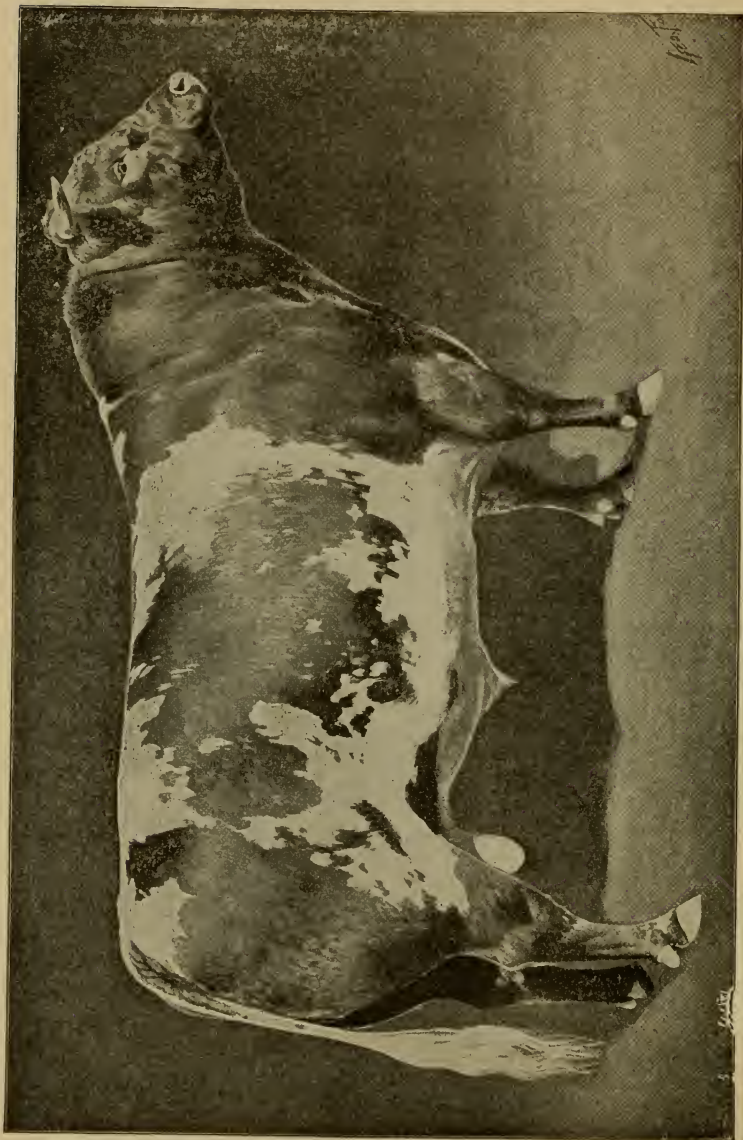
take the Hereford for heavy work, and the Devon for lighter and more active work, such as ordinary farm labor. For cheese or quantity of milk alone, take the Holsteins. For butter and cheese the Ayrshires are best, while for milk, exceedingly rich in cream, but, of course, not so great in quantity, the Jerseys, Alderneys or Guernseys would be indicated, according to the fancy of the breeder. In every case select the best cows possible as dams, at least for the animals intended to continue the cross.

VIII. Variation in Type.

We have spoken of variation in type, even of cattle bred with a view of perpetuating distinct characteristics. How common this is, any person may satisfy himself by inspecting the animals of any given kind at our animal fairs, especially horses and cattle. Among animals producing twins, such as sheep, the type may be established sooner, since there is a greater number of young to select from. In swine it may be established in a still shorter time, for they not only have many young at a birth, but they breed twice a year, and a sow has even been known to produce five litters in less than two years. In the longest-established breeds of swine, however, pigs of a litter will vary materially. Hence, in breeding swine, while it is comparatively easy to perpetuate a particular strain by careful selection, it is also as easy to destroy the effects of previous good breeding by bad selections as it is to depreciate them by neglect in feeding. For it is an axiom which should be more generally understood than it is, that bad feeding will soon mar good breeding. And as no success can be had with any breed, however ordinary it may be, without good feeding, it is essential that the improved breeds be carefully and liberally provided for, especially since the better the breed the better do the animals pay for their feeding.

IX. In-and-in Breeding and Breeding in Line.

The meaning of these terms has been defined in a previous part of this volume. One is the breeding together of animals very closely related; the other is the perpetuation of qualities, by continuing to breed together animals having similar characteristics. From in-and-in and line breeding we get, more often, what is called a "nick"—that is, the inheritance of some essentially good quality—than by what is known as out-crossing, or breeding to animals of dissimilar quality. The careful breeder will hesitate long before he resorts to out-crossing, and should only consent so to do where the family has become too fine, and constitutionally weak, from being bred very closely together for a considerable length of time.



ST. VALENTINE 121,014.

X. Altering the Character by Crossing.

When it becomes necessary to alter the form, do so through some animal of the same breed. Never go out of the breed for improvement even in constitutional vigor. If you do, you will always rue it. The Kyloe cross, made in the Short-Horns, nearly a hundred years ago, still crops out in certain families, in the sloughing of the horns, or in defective horns. Thirty years ago the outcrop of this peculiarity was quite common. If the character of your cattle needs altering, select for the purpose a bull possessing the characteristics desired, or as near thereto as may be possible. Once the effect is produced, return again to the practice of breeding in line, never neglecting careful selection. So also in breeding up common stock, by means of superior males, when once you have decided what breed is best for your particular use, stick to it. If the result is unsatisfactory, try another breed on certain cows, but not on those of your best improved stock. If you are breeding pure or thoroughbred stock, quit the business rather than take an out-cross upon some other distinct breed. Once the blood is in your herd, you cannot breed it out in your life time, nor can your successor breed it out in his life time.

XI. Influence of Shelter and Feeding.

In the breeding of all farm stock too many persons suppose that animals, especially cattle, may be exposed to the storms of winter without serious detriment, and that if they get very thin in winter, they will recuperate in the succeeding summer. No mistake could be more fatal to the stock raiser than this. An animal that barely survives the winter, seldom more than regains the flesh lost, during the next summer. Those that have to be "tailed up" in the spring never are good for much thereafter. The only profit there is in stock of any kind, is made by keeping them steadily growing, until they reach maturity. This is especially true in the case of improved stock of whatever breed. They must have sufficient warmth and feeding, for if disability arise from neglect, the loss is serious by comparison with the loss from similar injury to ordinary, cheap stock. It may be taken as an axiom, that no money was ever made by neglecting or starving farm stock; and no farmer ever will make money from cattle if he lets them take the "warm side of a straw stack" for food and shelter in winter.

XII. Heredity in Cattle.

We have already spoken of the hereditary influence of ancestors. In cattle this is often plainly shown. The thirteenth axiom of Stonehege, and one undoubtedly correct, is: The purer and less mixed the breed, the more likely it is to be transmitted unaltered to the offspring. Hence, which-

ever parent is of the purest blood will be more generally represented in the offspring; but, as the male is usually more carefully selected, and of purer blood than the female, it generally follows that he exerts more influence than she does; the reverse being the case when she is of more unmixed blood than the sire.

That the relative ages and vigor of the parents have a decisive influence on the offspring there is no doubt. Hence the necessity that animals be mature before they are allowed to breed, since only mature animals can be relied upon to produce offspring of the highest form and vigor. And on the other hand, that excessive age in either male or female, will diminish potency is too well known to be denied. It is certain, also, that where there is a marked prepotency in either the male or female parent, the progeny will most closely resemble the prepotent progenitor. The following case is reported by Mr. Talcot in the "Country Gentleman:" "I had a nice cow with nice bag and teats, which I took to a bull in the neighborhood, and the produce was a heifer-calf, which was raised because of the good milking-qualities of her dam; but when she became a cow, instead of the good qualities of her dam as was expected, her bag and teats were more like those of a sheep than of a good dairy-cow. I then began to investigate the cause, and found that the heifer was the counterpart of the dam of the bull, she being an ordinary cow with a small bag and still smaller teats, and from that time to this I have found that too frequently that is the case, especially if the bull was from such stock or family of light milkers that it was not desirable to perpetuate them. I remember distinctly the first pure-bred Short-Horn bull I ever had, that the bag of his dam was the largest in the hind-quarters, consequently that she gave the most milk from the hind-teats, and that quality was transmitted to the majority of his heifers when they came to be cows, their bags tending largely in the hind-quarters. And I think, from such observations, that there can be no doubt that such is the case generally."

Mr. Sedgwick says, the supply of milk is hereditarily influenced by the bull, rather than by the cows from which the offspring is directly descended. Of this there is no doubt; but it is not so clear, as asserted by him, that the character of the secretion, as regards both quantity and quality of the milk, is derived chiefly from the paternal grand-mother by atavie descent.

XIII. Hereditary Influence of Parents.

Mr. Walker, writing on intermarriage, and the physiology of breeding, gives the following:

"It is a fact, established by my observations, that, in animals of the same variety, either male or female parent may give either series of or-

gans—that is, either forehead and organs of sense, together with the vital and nutritive organs, or back-head, together with the locomotive organs.

“The second law, namely, that of crossing, operates where each parent is of a different breed, and when, supposing both to be of equal age and vigor, the male gives the back-head and locomotive organs, and the female the face and nutritive organs.

“The third law, namely, that of in-and-in breeding, operates where both parents are not only of the same variety, but of the same family in its narrowest sense, and when the female gives the back-head and locomotive organs, and the male the face and nutritive organs—precisely the reverse of what takes place in crossing.”

XIV. Atavism.

The appearance, occasionally, of horns in the Galloway, Suffolk and other breeds that have been hornless for many generations, but which were originally a horned race, are remarkable instances of atavism. The appearance, in a litter of Essex pigs, of two young ones showing the Berkshire cross of twenty-eight years before, as cited by Mr. Sidney, is also a remarkable case of the same kind. We have already noticed the occasional appearance, through atavism, of deformed horns in Short-Horn cattle. In calves, also, this race shows remarkably in this respect; the following case is given by the “Country Gentleman:”

“Mr. Wadsworth owns the twin Princess cows, Lady Mary seventh and eighth; they are both good roans, got by fourth Lord of Oxford (5903 “American Herd-Book”), a roan bull; their dam, Lady Mary, a red, got by Hotspur (31393), a roan; their granddam, Baroness, a red roan, got by Barrington (30501), a white; their great-granddam, the imported red Princess cow, Red Rose, second, got by Napier (6238), red roan. These twin heifers, Lady Mary seventh and eighth, were both served by the Princess bull, Earl of Seaham (8077 “American Herd-Book”), a good roan, and each dropped a bull-calf; but the one from Lady Mary seventh was a red, while the other, from Lady Mary eighth, was white.”

XV. Peculiarities of Ancestors Perpetuated.

In the breeding of animals of a pure and homogeneous breed, there will be a perfect blending of characteristics, without marked peculiarities, as a rule. In the offspring of dissimilar parents, as in crossing, there is never complete fusion or blending of character, but the offspring in such cases will follow, more or less closely, the prepotent parent. It is not necessary to cite authorities on this point. Instances are of such constant occurrence, both in the human family and down through all the domestic animals, that they have been noticed by all intelligent observers. In wild

animals, being pure races, the rule is not so apparent; for in them is found the nicest blending of transmitted qualities. Yet it is observed even in wild animals when bred in confinement. Devon cattle and other pure breeds of domestic stock, also show peculiarities to a less extent than more mixed races. Peculiarities of ancestors appear most frequently in the common mixed stock of the farm, especially when bred to sires of improved blood.

XVI. How the Short-Horns were bred up.

The inheritance of the prepotent blood of sires, upon an already valuable breed, careful selection and at length the impress of a bull, (Hubback,) remarkable in every respect, merged what were known as Teeswater, Durham or Yorkshire cattle, into what has come of late years to be known, the world over, as Short-Horns. The name is an unfortunate one in some respects, since it is used to designate one of the three distinct classifications of horned cattle.

Less than 200 years ago the first improvement was made in Short-Horn cattle, according to Culley, Marshall, Bailey, and others of the last century; and it is only within the last 100 years that the great improvement was made which causes this magnificent breed of cattle to be so highly prized. The "Alloy," a Galloway, or hornless, cross made by Charles Colling was unfortunate, and breeders are careful that their stock shall not trace back to this cross, which runs to Grandson of Bolingbroke and Lady—to the "Alloy" as this progeny was called.

XVII. Short-Horns During the Past Fifty Years.

It is within the last fifty years that the Short-Horns, once remarkable for their milking qualities, have degenerated in this respect so that they are now almost worthless for the dairy. They have been bred to eminent fineness and elegance, but it is questionable if, as beef producers, the less fashionable are not the better cattle. Originally the Short-Horns ran much to white; and roans also were very common. Of late years it has been more fashionable to breed to self-colors, or to animals in which the colors, whatever they may be, (red and white being the best,) are distinct and well defined, one from the other.

Importations of Short-Horns from Great Britain were made to the Eastern States in 1815, 1822, 1823, 1828, 1835, 1839, and 1849-50; to Kentucky in 1817, and again in 1837-38, and in 1839. Large importations were made into Ohio in 1834, and in 1835-36. The first direct importation to Illinois was made in 1858. Since 1835 Canadian breeders have imported many fine animals, and within the last ten years their herds have taken high rank in the world of Short-Horns. At the present time there are no States of the West, the Northwest and Southwest, but



DOUBLE STANDARD POLLED DURHAMS.
Noted Prize Winners.—Specially photographed for this work.

have most valuable herds of these remarkable beef cattle. When not bred from a mere fanciful standpoint of fineness, it must be confessed that they are unexcelled in stoutness, early maturity and great development of flesh.

XVIII. Three Short-Horn Strains.

Among the lessons learned from these changes, we have seen the Short-Horns gradually lose their great milking qualities, but they have gained in early maturity, and in disposition to take on flesh. They may now be divided into three classes :

First, are those combining good grazing qualities with fair milking qualities, as may be seen in the descendants of the importation of 1817 into Kentucky, or the "Seventeens" as they are called. None are better than these for the average farmer to breed from, and fortunately, when found, they sell at prices comparatively but little above those of the best native cattle of mixed breeds.

The second strain is the Booth blood, eminent for large frames, covered with great masses of flesh, but of small account as milkers.

The third principal strain is that of the Bates cattle, eminent for style and early maturity, with sub-families, producing occasionally most excellent milking cows.

The young breeder may rest assured that by studying carefully the precepts laid down in this chapter, and by familiarizing himself with the characteristics of the several strains, and also by studying carefully the pedigrees as given in the herd books, he will be qualified to select animals for the nucleus of his herd, that will breed constant to type, if he possess the judgment properly to mate them.

XIX. The Three Principal Types of Cattle.

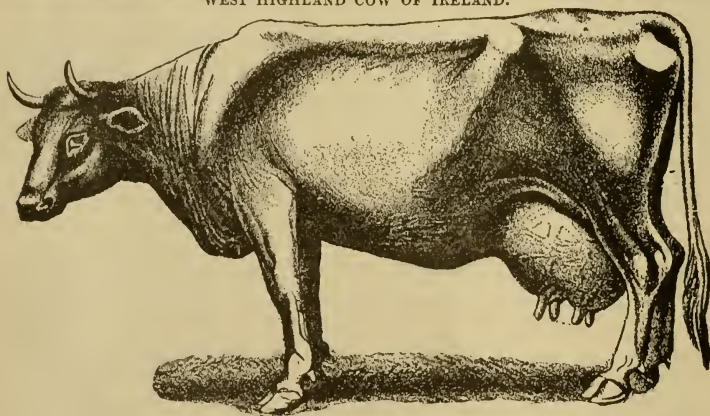
It remains to close this chapter with a recapitulation of the three principal types of cattle. These are the Long-Horns, the Middle-Horns and the Short-Horns. Of the Long-Horns, sub-breeds remain worthy of perpetuation in competition with the Middle-Horns, as represented by the Herefords or Devons, or the Short-Horns, as represented by the Durhams. The milking breeds are the Jerseys and other Channel Island cattle, and the Ayrshires and the Holsteins.

Among the traces of long-horned blood, characteristic of the old Shropshire, with their horns dropping down forward and suddenly rising, the Derby with their horns running sideways, and curving upwards and backwards, and the Cravens, with their "lopped horns," may all be found occasionally in the ordinary mixed breeds of the country, showing how long a time it takes to work out the blood from whence they originally came.

As for the once-famous New Leicesters, of Bakewell, their popularity was short-lived, since they practically died out with the death of their founder, Bakewell



WEST HIGHLAND COW OF IRELAND.



FLEMISH COW.

The Flemish cow represented on this page is not such an abundant milker as some other breeds, but her milk is very rich and fine in flavor. In disposition this breed is as gentle and kind as it is possible for cattle to be. A child can approach them anywhere or at any time, and lead them or play around them, without fear of harm.

The Short-Horns will be treated of in their appropriate chapter, the Herefords and Devons in the chapter appropriated to the Middle-Horns. and the polled cattle, also, in a separate chapter.

CHAPTER IV.

THE BREEDING OF CATTLE.

I. EARLY SYSTEMS OF BREEDING.—II. BAKEWELL'S TEN RULES.—III. WHAT THE BREEDER MUST KNOW.—IV. COMPARE RESULTS.—V. THE ASSIMILATION OF FOOD.—VI. THE BREEDER MUST BE A GOOD FARMER.—VII. BREEDING FOR BEEF.—VIII. BREEDING FOR MILK.—IX. BREEDING FOR LABOR.—X. THE BREEDS FOR BEEF AND MILK.—XI. SOME FACTS ABOUT BEEF.—XII. VALUE OF SIRES IN DIFFERENT HERDS.—XIII. KNOW WHAT YOU BREED FOR.—XIV. DEFINITION OF TERMS.—XV. HOW TO START A HERD.—XVI. HOW THE HERD WILL GRADE.—XVII. TAKING A LINE CROSS.—XVIII. SOME SPECIMENS OF CLOSE BREEDING.—XIX. THE GESTATION OF COWS.

I. Early Systems of Breeding.

Until within the last 200 years the whole art of breeding animals might have been summed up in the aphorism, "Like produces like;" and hence that other proverb, "Breed from the best." Yet, simple as these principles were, they seem to have been followed in a very feeble way, as, indeed, they are to this day by a majority of farmers, or by those who have not studied the principles of the art they practice.

Up to the time of Bakewell, who, had he undertaken any other profession than that of breeding animals, would have been eminently successful, the breeder's art consisted in mating those animals whose general characteristics seemed the best, wholly disregarding the advantages of breeding to animals pre-eminent for the possession of particular qualities that it was essential to perpetuate. Bakewell believed not only that like would produce like, in a general way, but seems to have known that the rule extended to the minutest detail in the organization and make up of the animal. Hence, his study of form, in the anatomy and physiology of animals, was made with a view to the adoption of a standard, or model, by which he sought to secure large proportions, early maturity, superior flesh in the choicest parts, and uniformity in the transmission of these qualities from the sire and dam to the young.

His eye seems to have been so well trained in detecting faults in the development of animals, and the proper correlation of the parts, one to the other, that the slightest variation of form never escaped him. No breeder since his time seems to have used such nice judgment, or to have possessed so critical and thoroughly trained an eye. None of his successors have equaled him in the capacity to trace cause and effect, or to

breed closely to a well-defined standard. In addition to his nice judgment in selection, he was the most careful of feeders; the object in view being constant development from birth to the butcher's block. None before or since his time have ever brought a breed up to the highest possible standard in a single lifetime, and what is more curious, none were found able to maintain the standard he had fixed. The methods instituted by Bakewell have been practiced by others, and are undoubtedly the best in the breeding of live stock. They may be divided into separate heads as in the following section.

II. Bakewell's Ten Rules.

- 1.—Correct training of the eye and judgment in the anatomy and physiology of the animal.
- 2.—The correlation of the several parts one to the other.
- 3.—The selection and mating of animals with a view to the fullest development of the most valuable parts, according to the use intended.
- 4.—Selection with a view to the perpetuation of essential qualities to induce form, symmetry, high feeding qualities, and great vigor of constitution.
- 5.—Feeding with reference to early maturity for giving development in the least possible time.
- 6.—Shelter and warmth indispensable to perfect development.
- 7.—Variety of food is essential, and this according to the age of the animal.
- 8.—A strain of blood once established, never go outside of it for a new infusion.
- 9.—The most perfect care and regularity in all matters pertaining to feeding and stable management.
- 10.—Kindness and careful training absolutely necessary with a view to the inheritance of high courage combined with docility and tractability.

III. What the Breeder Must Know.

The animals which possess the qualities that are desired in the offspring, whether for beef, labor, milk, butter or cheese, or for a combination of these, are the ones to breed from. In the selection of parents the breeder himself must of course be the judge of the fitness of certain animals of his herd to transmit the desired qualities. We have endeavored to aid the non-professional breeder in the performance of this delicate task, by carefully describing the peculiarities of the different breeds and varieties, and by indicating the best points of each of them. Nothing more is necessary to enable the average farmer to breed his farm-stock profitably and successfully, except such personal experience with animals as every competent

farmer possesses as a matter of course. Those who propose to go exclusively and scientifically into the business of stock-breeding, must not only pass through a careful course of reading in the best authorities on the subject, but must also have a thorough practical training. The important thing of all, however, is to possess the peculiar talent to make a breeder—that is, a critical eye for form, symmetry, and the proportion of the several parts of an animal, each to the others.

IV. Compare Results.

A careful comparison of the results obtained by others and by one's self, is among the best means of training for all. The animal that will make the most beef at three years old, and the cow that will give the most milk, and the richest in butter or cheese during the season, on the least relative quantity of food, are the best. These things can only be learned through personal observation and from the statements of those whose word you can trust.

V. The Assimilation of Food.

It is an idea with many people that an animal, to be valuable, must be a small eater. Nothing could be further from the truth. It is merely a question of proper assimilation of the food eaten—an animal of perfect digestive and assimilative organs being able to extract far more nutriment from a given quantity of food than one in which these organs perform their functions but imperfectly. In this respect the improved breeds of stock of any family stand pre-eminent. Their digestive and assimilative organs are of the best and they give greater returns for the food eaten than illy-bred animals.

The lungs and blood vessels of the ox are not required to be so capacious, according to the weight of the animal, as those of the blood-horse; for they are not required to do fast work. The improved breeds of other farm stock are not required to take more exercise than is necessary to gather their food. Hence, with care and artificial feeding, the inclination to active exercise is bred out of them, and a Short-Horn or Hereford will keep fat on what a Texan would run off in untamable muscular efforts. Thus, for domestic use, the highly-bred Short-Horn or Hereford possesses two important advantages over the wild Texan, viz: early maturity, and the tendency to fatten readily.

A raw-boned ox, or one with a hide like a board, will not fatten kindly. Hence, the outlines should be square or round, with no undue bony prominences, and the skin should be soft, but firm and supple to the touch.

Restlessness, which is only another term for wildness, should never be tolerated in any breeding animal. Such animals should be sent to

the butcher's block without hesitation. A panic will throw a whole herd off their feed for a week, sometimes, and a single wild brute is amply sufficient to get up a stampede at the slightest provocation. The animal that shows viciousness alone, or in connection with restlessness, is not to be tolerated anywhere, and least of all in the breeding stables or yards.

VI. The Breeder Must be a Good Farmer.

The best animals cannot be raised except on a variety of food. The breeder should therefore be a good farmer, and should know what grasses are most nutritious and best adapted to his locality. He needs, also, to know the varieties of grasses which make the best hay, for all farm animals—cattle and sheep especially—should be kept as much on grass as possible. He should also have studied the important question of winter feeding with a view to deciding what grains are best adapted to his use.

An important matter, which nearly all American breeders and feeders more or less neglect, is the use of succulent food in winter. It is seldom one sees a supply of roots raised for winter feeding in this country. We have deferred too much to English authorities, and because we could not raise English white turnips we have ignored roots almost entirely. Yet, there is no country better adapted to carrots and beets, for feeding, than ours, nor one where they can be more cheaply raised. And carrots in winter, especially for breeding cows, and later on beets for all farm stock except horses, are worth more than twice their bulk in turnips. A peck of beets or carrots daily, to each cow or ox would assist in an important manner the digestion and assimilation of dry food—and herein lies their chief value. The writer has raised them in large fields at a cost of three dollars a ton, including the expenses of hauling and pitting for winter.

VII. Breeding for Beef.

If you breed for beef you will have the choice of, say, four breeds of cattle—the Short-Horns, the Herefords, the Devons, and the Galloways. The Short-Horns and Herefords are, by all odds, the best breeds wherever the pastures are flush, and the feed plentiful. On short pastures, and when the winter feeding is not ample, their great frames cannot be supplied; but when the feed is abundant they may be turned off fat at an age at which native cattle are only just getting ready to be fattened.

Upon all hill pastures, both North and South, the Devons are admirable cattle, and their beef is of a quality superior to that of either of the breeds just named.

Farther North, the Galloways or hornless cattle are much liked for their good feeding qualities, for their hardiness and for the superior

quality of their beef. In more Northern regions the Galloways may justly be regarded as the best among our beef breeds. But they will never compare with the Short-Horns or Herefords in milder regions where feed is abundant.

VIII. Breeding for Milk.

If milk be the sole object, the breeder will choose the Ayrshires, the Jerseys or the Holsteins. Of these the Holsteins give the largest quantity of milk, are the largest cattle and they make heavy beef when dry. They are the best for cheese, and are, also, the most profitable when the milk is to be sold directly to the consumer. The Ayrshires come next in the quantity of milk given, and they are, also, excellent both for butter and cheese. The Jerseys, Alderneys, and Guernseys are smaller cattle than either the Holsteins or Ayrshires, but, for their size, they give large quantities of milk that is extremely rich in cream and butter. But they require more feed in proportion to their size than either the Ayrshires or Holsteins.

IX. Breeding for Labor.

Where animals capable of performing labor are desired, either the Herefords or the Devons should be selected. For heavy draft, such as hauling great logs in the timber, the Herefords are excellent cattle. For general utility on the farm, and on the road, the Devons are superior to any other known breed, since they combine great activity with muscular strength, and the ability to go long distances at a quick pace, without distress. The Holsteins also make excellent draft animals, and to our thinking are among the best, where many purposes, milk being the most important, are to be considered.

X. The Breeds for Beef and Milk.

For the two purposes of milk and beef combined, the milking strains of the Short-Horn family are the best. It is a pity that the noble breed of milking cattle, known formerly as the Patton stock, should have been practically lost. Forty years ago they were the staunch, excellent Short-Horns of the West, good at the pail, large, smooth-framed and kindly fatteners. The farmer who wishes to breed similar cattle, may easily do so by selecting the better milkers of the importation of 1817—the “old Seventeens” as they are called. But be sure you do not get animals of this race with “top crosses” of the now fashionable Short-Horns. They will make beef but not milk.

The Holsteins should not be passed over in naming cattle for general utility, especially in the West and Southwest. They are abundant and uniform milkers, and good feeders. They make more than fair working

steers, and when fat they also turn out a heavy carcass of beef, of fully as good quality as the Short-Horns. Yet, they lack early maturity.

XI. Some Facts About Beef.

The breeder for utility, from a purely practical stand point, wants animals that will bring the largest return in dollars and cents. A steer that loads with mere fat, instead of muscle, will not bring so much as the one which turns out more meat and less fat. So, again, the steer whose flesh is marbled throughout with fatty tissue will bring a higher price for beef than one all lean in the lean parts, and all fat in the fat parts. Hence, in estimating the possible profits in breeding for beef, one must know how the animal will cut up when killed. As a rule the smooth steer will "kill better" than a patchy one, or one with lumps or patches of fat over the surface. An animal will not marble with fat until it is mature, neither will it take on fat largely, while in a growing state. Hence, the value of early maturity, and the importance of knowing those breeds, or families of a breed, which mature earliest. The Short-Horns have somewhat the advantage of the Herefords in early maturity, while the Herefords have the advantage of the Short-Horns in the quality of their flesh. The Devons mature still later than either, but their "butchers' proof" is better. The Galloways mature between the Hereford and Devon in point of time, and their flesh is certainly excellent. Those animals which mature earliest are, as a rule, not so excellent in the quality of the flesh as later-maturing ones. Hence, in England, the Highland cattle bring the highest price per pound of any, and in the United States the Devons ought to.

XII. Value of Sires in Different Herds.

The average farmer cannot pay the extravagant prices demanded for the highest-caste animals of a pure breed. These, however necessary to the special breeder, are not so to the general breeder, or to the farmer who breeds simply for beef or for milk. The farmer wants animals having thick flesh and good feeding qualities, with constitutional vigor, from which to breed beef cattle; and when milk is an object the animals from which he breeds should also be known to possess high milking qualities. In the one case it is the flesh that pays, in the other the udder.

To the breeder of a particular strain, an animal containing certain valuable points might be worth many thousands of dollars in his herd, while to the farmer the value of the same animal would be counted by hundreds of dollars only. In fact, that particular animal might not be worth as much to the farmer as another that might be bought for \$100. In respect to milking qualities, a certain bull might be worth \$1,000 to the breeder

of a particular sub-family of milkers, while to the farmer, intending to breed him upon a mixed herd, \$100 would be his full value.

A cross of "Seventeen" blood might be a good and sufficient reason for the refusal by some special breeder to buy a particular Short-Horn, while to the general breeder it would be no disadvantage; and if the animal were a pure "Seventeen"—descended in a direct line from that importation—the outcome might be **richer in beef and milk than the other**. Hence it is seen that the farmer who breeds simply for milk or beef, should possess as accurate information concerning what he wants as the breeder of select animals of some particular strain of blood.

XIII. Know what You Breed For.

The breeder for general utility must possess as accurate knowledge as the breeder for special utility, but this knowledge needs to be of a different kind from the other. The breeder for general utility cares not so much that the blood be of some particular strain, as that it shall combine certain points that will bring beef or milk into the produce of his herd, and at the least expense.

What the general breeder is seeking for is such refinement in the head, neck, lungs, digestive organs, blood vessels and limbs, as will tell in the best manner upon his coarser stock. He would be guided by different standards in buying a thoroughbred horse from those he would adopt in buying a draft horse; and in buying an animal solely for beef, the breeder must choose from a different standpoint from that which he takes in buying for milk, labor, or a combination of two or more of these qualities. But in this day of special breeds for special purposes great excellence in all points cannot be expected in one and the same animal. No bull can be a getter of great milkers, great workers, and great beef makers. All these qualities were never combined in one animal and never will be.

XIV. Definition of Terms.

Pure Bred.—The words "pure-bred," "full-blood," and "thoroughbred" have often been stumbling blocks to the uninitiated. A pure race, or race of "pure-bred animals is one of unmixed lineage whose characteristics are well defined, and which breeds pure to the type in every essential particular, including form, color, temper, and of course power to transmit the same. The Devons come nearer to filling all these requirements than any other cattle, and are the best type of a pure breed.

Thoroughbred.—A thoroughbred is the descendant of animals originally of mixed lineage, but which have been inter-bred for so long a time—without further admixture—that they come essentially true to the type

desired. Short-Horns and Herefords among cattle, and racing horses are thoroughbred.

Full-Blood.—Full-blood is a term that should not be used to denote either purity of blood or thorough-blood, though much confusion has existed in the popular use of these three terms. High-grade animals are the produce of pure stock upon common stock, and when pure stock is repeatedly bred to the progeny of such unions the progeny in the course of some generations nearly approaches the pure race in every characteristic and is then called "full-blooded."

Grades.—This term was partly defined in the preceding paragraph. It is used to denote the offspring of pure-blooded or highly-bred animals with those of less breeding, and is generally applied to a cross of pure-blood on common stock.

Cross-Breeding.—The breeding together of animals of different breeds is called cross-breeding, as for instance the union of Hereford and Short-Horn blood. In the first cross, the progeny theoretically possess equal proportions of the blood of sire and dam, but the blood of pure animals being prepotent the progeny will possess more strongly the characteristics of the highly-bred parent than of the other. Hence the advantage of using a bull of pure blood on a herd of mixed blood.

XV. How to Start a Herd.

From among the best cows of the ordinary mixed farm stock, select those possessing in the highest degree the characteristics desired in the offspring. For ten two-year old heifers select a pure-blood yearling bull, that has come of stock noted for getting uniform milkers, if this be the object; or, if beef be the object, he should be of excellent fineness, with great loins, rump and thighs and round barrel-ribs well sprung out, and ribbed close to the hips. The next season's produce should be ten calves, half of which are likely to be heifers. Save these and geld the bulls at the age of about three or four weeks. When these heifers are two years old breed them to their sire, who will then be four years old. The female produce of this union may again be bred to the same bull, and this process may continue to the fourth generation, if the bull lasts so long in the possession of vigor. His last get will thus inherit fifteen sixteenths of the blood of the sire. Select from these the heifers that show the strongest constitutional vigor, and follow this down through the intermediate grades, keeping the families distinct. That is, record the breeding of each animal separately in a book specially prepared for the purpose.

XVI. How the Herd will Grade.

Your herd will grade as follows: The first generation will be half-blood grades; the second three-quarters blood; the third, seven-eighths blood

and the fourth generation, fifteen-sixteenths blood, and will compare favorably with pure-blooded animals, except among critical judges.

XVII. Taking a Line Cross.

In breeding so closely as we have recommended, the exercise of careful judgment is necessary, so that you may cease breeding in-and-in whenever it is found that the constitutional vigor, or feeding qualities of the progeny are impaired. If it be found that the progeny is not improving in all essential qualities select another sire, but one combining the same essential qualities as the discarded sire. This departure will be breeding in line. Breed again with this bull to certain select heifers for two generations, and then take another line cross. In this way a young farmer, who is not able to attempt thoroughbreds, may soon establish a herd that will give the best possible satisfaction as beef makers or milkers, as the case may be. Do not listen to any sentimental talk about incestuous breeding. Incest is not a crime among the lower animals; it is nature's plan with them. Among gregarious animals the strongest males take the herd, to the second and third generation. The object is to throw the good qualities of the sire in a lump, and also to secure the first impress, a most important point, upon the heifer, and to fix this impress by concentration. For, the oftener the dam is bred to the same sire, the more will she be imbued with the blood of the sire of her progeny, through the intercirculation of blood between the dam and the fœtus. This intercirculation, though denied by some, is undoubtedly a physiological fact, proven by many coincidences, if not by absolute demonstration, and fortified by striking resemblances.

XVIII. Some Specimens of Close Breeding.

As showing close in-an-in breeding the first volume of the American Herd Book contains a diagram of the breeding of Comet, from Hubback and Lady Maynard, as follows:

- | | |
|---------------------------|------------------------|
| 1. Bull, Hubback. | 8. Cow, Lady Maynard. |
| 2. Dam of Haughton. | 9. Bull, Bolingbroke. |
| 3. Richard Barker's Bull. | 10. Cow, Lady Maynard. |
| 4. Cow, Haughton. | 11. Cow, Phœnix. |
| 5. Bull, Foljambe. | 12. Cow, Young Phœnix. |
| 6. Cow, Young Strawberry. | 13. Bull, Favorite. |
| 7. Bull, Dalton Duke. | 14. Bull, Comet. |

In relation to Favorite or Lady Maynard, Mr. A. B. Allen says: "It was conceded by a company of old breeders in 1812, in discussing the question of the improvement of Short-Horns, that no stock of Mr. Colling's ever equalled Lady Maynard, the dam of Phœnix, and granddam of

Favorite (by Foljambe) and of young Phoenix (by Favorite, her son, upon his own mother,) the dam of Comet 155, so celebrated as having been sold for 1000 guineas (\$5000,) also by Favorite, a specimen of as close in-and-in breeding as can perhaps be found on record."

As an example of wonderful depth of in breeding with continued good results, the cow Clarissa may be mentioned. She possessed sixty-three sixty-fourths of the blood of Favorite. Her pedigree runs thus: "Cow Clarissa, roan, calved in 1814; bred by Mr. R. Colling, got by Wellington (680) out of—by Favorite, (852)—by Favorite,—by Favorite—by Favorite—by Favorite—by Favorite—by a son of Hubback."

Wellington, the sire of Clarissa, was also deeply in-bred with the blood of Favorite. Taking the two pedigrees—that of Clarissa and Wellington together—they will read thus:

- | | |
|----------------------------|---|
| 1. Bull, Hubback. | 10. 6th cow by Favorite. |
| 2. Son of Hubback. | 11. Clarissa. |
| 3. Cow, by son of Hubback. | 12. Bull Wellington, sire of Clarissa. |
| 4. Bull, Favorite. | 13. Bull, Comet. |
| 5. 1st cow by Favorite. | 14. Cow, Wildair. |
| 6. 2nd cow by Favorite. | 15. Cow, Young Phoenix. |
| 7. 3rd cow by Favorite. | 16. Cow Phoenix. |
| 8. 4th cow by Favorite. | 4. Same bull Favorite on the side
of Clarissa's sire as on the
side of her dam. |
| 9. 5th cow by Favorite. | 17. Bull, Bolingbroke. |
| | 18. Granddaughter of Hubback. |

There ought to be no fear of following where such results have been attained by others, and these the most eminent and successful breeders of their day. The best successes since their day have also been obtained by continuing the same course to such a degree as intelligent observation showed to be practicable, and especially by breeding in line.

XIX. The Gestation of Cows.

Some years since the writer collected a number of facts in relation to gestation and the influence of the varying times of gestation on the young, to refute a prevalent idea that protracted gestation produced males. Mr. Tessier, for forty years an accurate and acute observer of various animals, gives results in the case of over 575 cows, and these subsequently having been extended to 1,131 cows the extremes were not changed, but results as to averages are as stated below.

Earl Spencer also carefully tabulated the period of gestation of 766 cows, the least period being 220 days; the mean 285 days; and the long-

est 313 days. He was able to rear no calf produced at an earlier period than 240 days. According to Tessier, a cow may carry a calf 321 days and produce it sound; and from the fact that Tessier and Earl Spencer agree almost exactly as to the mean time of gestation, 285 days or nine and a half months may be taken as the average time of gestation of cows, slight variations being allowed from this for different breeds.



AYRSHIRE COWS.

This is emphatically the Scotch dairy breed. No other breed of cattle in Scotland will produce an equal amount of milk, butter and cheese. Six hundred gallons of milk per year is considered an average yield for the cows on a well-kept farm. Their color is generally of red and white in spots; sometimes white and black, or red or brown. The horns are fine and twisted upward, and the face long, with a lively yet docile expression.

It is quite safe to conclude, from the results of experiments with various races of animals, that the period of gestation has no influence whatever upon the sex of the offspring, nor is it probable that the sex of the foetus has any influence upon the period of gestation. There is a strong probability, however, that heredity in sires and dams, early maturity, ages of the dam and sire, and other causes, may result in longer or shorter periods of gestation.

CHAPTER V.

SHORT-HORN CATTLE.

I. SHORT-HORNED BREEDS.—II. THE OLD TEESWATERS.—III. ORIGIN OF MODERN SHORT-HORNS.—IV. WHAT MADE THEM FAMOUS.—V. THE BULL HUB-BACK.—VI. BEEF FROM THE OLD TEESWATERS.—VII. SHORT-HORNS IN AMERICA.—VIII. THE GREAT OHIO IMPORTATION.—IX. KENTUCKY AND OTHER IMPORTATIONS.—X. IMPORTATION OF BATES CATTI.—XI. CANADIAN SHORT-HORNS.—XII. WESTWARD MARCH OF THE SHORT HORN.—XIII. SHORT-HORNS AS BEEF MAKERS.—XIV. THE PATTON FAMILY OF SHORT-HORNS.—XV. GRADE COWS AND STEERS.—XVI. SHORT-HORNS CRITICALLY DESCRIBED.—XVII. THE HEAD.—XVIII. THE NECK.—XIX. THE BODY.—XX. THE LEGS SHORT AND STRAIGHT.—XXI. THE LOIN BROAD.—XXII. WIDE IN THE CROPS.—XXIII. THE BACK STRAIGHT AND BROAD.—XXIV. THE RIBS BARREL-SHAPED.—XXV. THE TOUCH.—XXVI. THE HIDE.—XXVII. THE HAIR.—XXVIII. THE COLOR.—XXIX. BEEF POINTS ILLUSTRATED.—XXX. SCALE OF POINTS FOR SHORT-HORN BULLS.—XXXI. SCALE OF POINTS FOR SHORT-HORN COWS.

I. Short-Horned Breeds.

Of the short-horned breeds of England of 100 years ago, represented by the Durham or Teeswater, the Yorkshire, the Lincolnshire and the Holderness, all are probably descended from a common origin. The descendants of the old Durham and the Channel Islands cattle, (Jersey and Alderney notably) are all that can now be distinctively recognized as having attained special celebrity. The name Short-Horn is not now used to designate any but the descendants of the Durham cattle, as improved, and is now applied distinctively only to them.

The Jerseys will be treated of in their proper chapter as among the breeds entitled to distinguished merit, the Short-Horns as standing at the head of established beef breeds being under consideration here.

II. The Old Teeswaters.

There has existed from a remote period in the region of the Teeswater (one of the small rivers of England), a race of short-horned cattle that were possessed of good feeding qualities combined with early maturity and thick flesh, as weights were considered 200 years ago. Their origin has been variously stated, but nothing is truly known of it and only traditionary statements are extant.

III. Origin of Modern Short-Horns.

The origin of the modern Short-Horn is not fully agreed on, except that they have descended directly from the Teeswaters or old Durhams on one side, and that they were gradually improved by breeders who recog-

nized their excellence. In the latter part of the last century, such breeders as the Collings (Charles and Robert), Sir Henry Vane, Col. Trotter and Mr. Mason, and—early in the present century—Mr. John Stevenson, Mr. Bates, and Mr. Booth proceeded scientifically and systematically to improve them. Mr. Bates died in 1849, at which time the breed had attained a world-wide celebrity, and this steadily grew, until the extravagant sums of \$20,000, \$30,000 and even \$40,000 were bid for single animals. To-day there are none of the cow kind that bring such prices for single animals.

IV. What Made Them Famous.

Youatt and Martin say the circumstance which first brought these wonderful cattle into special notice was the production of the “Durham ox,” which was exhibited all over England, and at the age of eleven years dislocated his hip and was killed, weighing 3,780 pounds, after having been carried from place to place in a “jolting carriage” for seven years, or since he was five years old. In February, 1801, at five years old he weighed 3,024 pounds. This extraordinary weight, our authority says, did not arise from his superior size, but from the excessive ripeness of his points.

V. The Bull Hubback.

Probably no single animal in the history of Short-Horns has exercised so great an influence for good on this breed as the bull Hubback. Of him Mr. Youatt says: “The following account of Hubback we had from Mr. Waistell, of Alibill, who, although his name does not appear conspicuously in the Short-Horn Herd Book, deserves much credit for his discrimination here. He used to admire this bull as he rode by the meadow in which he grazed; and at length attempted to purchase him. The price asked, 8*l.*, seemed much, and the bargain was not struck. Still he longed for the beast; and happening to meet Mr. Robert Colling near the place, asked his opinion of the animal. Mr. Colling acknowledged that there were good points about him; but his manner induced Mr. Waistell to suspect that Mr. Colling thought more highly of the bull than his language expressed, and he hastened the next morning, concluded the bargain, and paid the money. He had scarcely done so before Mr. R. Colling arrived for the same purpose, and as the two farmers rode home together they agreed that it should be a joint speculation.

“Some months passed by, and either Mr. Waistell’s admiration of the bull cooled, or his partner did not express himself very warmly about the excellences of the animal, and Messrs. Waistell and R. Colling transferred Hubback to Mr. C. Colling, who, with the quick eye of an experienced breeder, saw the value of the beast. Mr. Waistell expressed to us

(October, 1832) his regret at having been induced to part with him, and his extreme disappointment that when Hubback was so sold, Mr. Charles Colling confined him to his own stock, and would not let him serve even one of Mr. Waistell's cows."

VI. Beef from the Old Teeswaters.

That the original Teeswaters and their early descendants were good cattle, and a most excellent foundation to work on, the following record of weights from 1794 to 1822 will show: In 1794, of an ox four years and ten months old, the four quarters weighed 145 stones, 3 lb.; tallow, 24 stones, 7 lb., (2376 lbs.) A steer, under four years old; four quarters, 106 stones; tallow, 19 stones, 7 lb., (1757 lbs.) 1814.—A steer, three years and nine months old; four quarters, 101 stones; tallow, 15 stones, (1624 lbs.) 1815.—A steer, three years eleven months old; four quarters, 112 stones, 7 lb.; tallow, 26 stones, (1939 lbs.) A heifer, three years eight months old; four quarters, 89 stones, (1246 lbs.) 1817.—A steer, three years two months old; four quarters, 95 stones, 10 lb.; tallow, 17 stones, 10 lb., (1528 lbs.) 1822.—An ox, four years and a half old; four quarters, 135 stones; tallow, 21 stones, (2184 lbs.)

VII. Short-Horns in America.

Mr. Allen, the editor of the Short-Horn Herd Book, in his work on American cattle, gives an exhaustive account of importations of Short-horns into the United States, from which we gather the following record of the more important importations:

Soon after the Revolutionary War, a few cattle supposed to be pure Short-Horns, were brought into Virginia. These were said to be well-fleshed animals, and the cows remarkable for milk, giving as high as thirty-two quarts in a day. Some of the produce of these cattle, as early as 1797, were taken into Kentucky by Mr. Patton, where they were called the "Patton stock." They were well cared for, and made a decided improvement in the cattle of the Blue Grass country.

In 1815-16, Mr. Cox, an Englishman, imported a bull and two heifers into Rensselaer county, New York. They were followed in 1822 by two bulls, imported by another Englishman named Hayne. Descendants from this Cox stock were said to be bred pure, and afterwards crossed by Mr. Hayne's bulls. The stock now exists in considerable numbers and of good quality, in that and adjoining counties.

In 1817, Col. Lewis Sanders, of Lexington, Kentucky, made an importation of three bulls and three heifers from England. They were of good quality and blood, and laid the foundation of many excellent herds in that State. In 1818, Mr. Cornelius Cooledge, of Boston, Massachusetts, imported a yearling heifer—"Flora"—and a bull—"Cicero"—

into that city, from the herd of Mr. Mason, of Chilton, in the county of Durham, England. These were carefully bred, and many of their descendants are now scattered throughout several States.

SHORT-HORN COW RUBERTA.



Shortly previous to 1821, the late John S. Skinner, of Baltimore, Maryland, imported for Governor Lloyd, of that State, a bull—"Champion"—and two heifers—"White Rose" and "Shepherdess"—from the

herd of Mr. Champion, a noted English breeder. From these, several good animals descended, some of which are now known.

In 1823, Mr. Skinner also imported for the late Gen. Stephen Van Rensselaer, of Albany, New York, a bull—"Washington"—and two

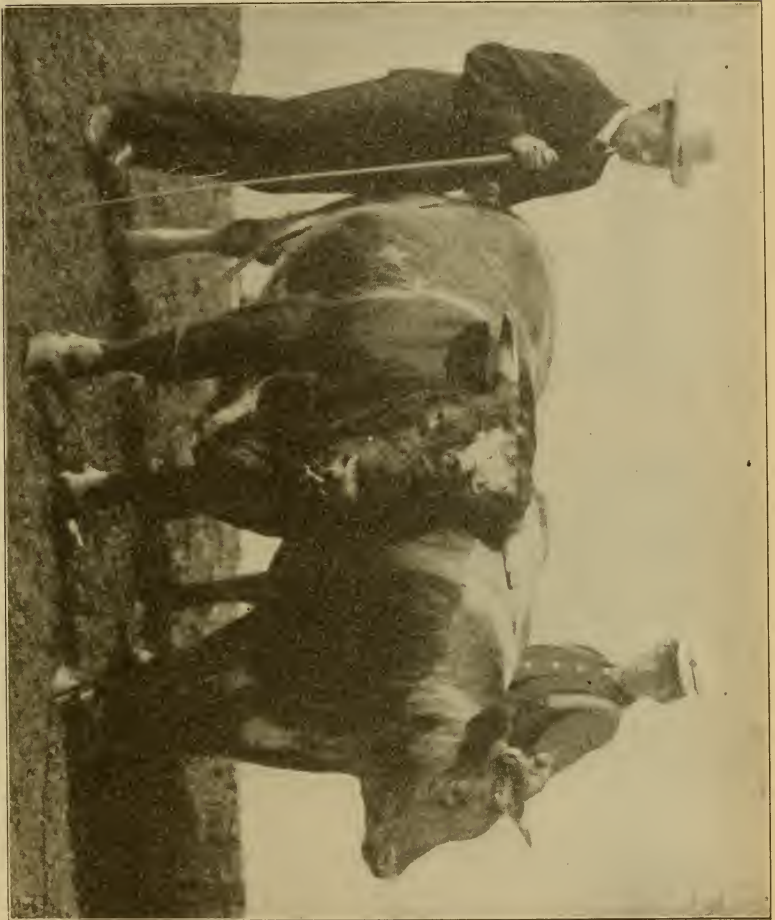


CRIMSON ROBE.

Sire Golden Robe, No. 20,396; dam Crimson Gem. He won first prize for over one and less than two years old sweepstakes for best short-horn steer, any age, at the Provincial Fat Stock Show, Guelph, Ontario, Bred, owned and exhibited by Isreal Graff, Alma, Ontario.

heifers—"Conquest" and "Pansey"—from the same herd of Mr. Champion. Conquest did not breed; Pansey was a successful breeder, and many of her descendants are now scattered over the country

During the years 1822 to 1830, Mr. Charles Henry Hall, of New York, imported several Short-Horn bulls and cows, from some of the best English herds. Their descendants are now scattered through several good herds.



PAIR OF DURHAM CATTLE.
Specially photographed for this work.

In 1824 the late Col. John Hare Powell, of Philadelphia, Pa., commenced importations, and for several years continued them with much

spirit and judgment. He bred them assiduously at his fine estate at Powelton, near the city, and sold many to neighboring breeders, and to go into Ohio and Kentucky, where many of their descendants still remain.

In the year 1833, the late Mr. Walter Dun, near Lexington, Ky., imported a bull and several valuable cows from choice herds in Yorkshire, England. He bred them with much care, and their descendants are now found in many good western herds.

VIII. The Great Ohio Importation.

But the first enterprise in importing Short-Horns upon a grand scale was commenced in 1834, by an association of cattle breeders of the Scioto Valley, and its adjoining counties, in Ohio. They formed a company with adequate capital, and sent out an agent who purchased the best cattle to be found, without regard to price, and brought out nineteen animals in one ship, landed them at Philadelphia, and drove them to Ohio. Further importations were made by the same company, in the years 1835 and 1836. The cattle were kept and bred together in one locality, for upwards of two years, and then sold by auction. They brought large prices—\$500 to \$2,500 each.

IX. Kentucky and other Importations.

In 1837-8-9, importations were made into Kentucky, by Messrs. James Shelby and Henry Clay, Jr., and some other parties, of several well-selected Short-Horns, some of which were kept and bred by the importers, and the others sold in their vicinity.

In 1837-8-9, Mr. Whitaker sent out to Philadelphia, on his own account, upwards of a hundred Short-Horns, from his own and other herds, and sold them at auction. They were purchased at good prices, mostly by breeders from Pennsylvania, Ohio, and Kentucky, and distributed widely through those States.

About the year 1839, Mr. George Vail, of Troy, N. Y., made an importation of a bull and heifer, purchased of Mr. Thomas Bates, of Kirkleavington, the first cattle from that particular herd which had been introduced into the State. A few years later, he purchased and imported several more cows from the herd of Mr. Bates, crosses of his "Duchess" and other families. He bred them with success and widely distributed their blood.

X. Importation of Bates Cattle.

Mr. Thomas Bates, a distinguished Short-Horn breeder in England, died in 1849. His herd, fully equal in quality to any in England, was

sold in 1850. The choicest of them—of the “Duchess” and “Oxford” tribes—fell mostly into the hands of the late Lord Dacie. He was a skillful breeder, and of most liberal spirit, and during the brief time he



DEVON BULL—MOXHEM 7564.
Specially photographed for this work.



JERSEY COW, HENBURY GENTLE.

held them the reputation of the Bates stock, if possible, increased. Within three years from the time of the sale of Mr. Bates' herd, Lord



IMPORTED AYRSHIRE COW—FLORA 3d—A TYPICAL COW.
Specially photographed for this work.



AYRSHIRE HEIFER—LOLA OF ROSEMONT 17895.
Specially photographed for this work.

Dacie died. In 1853, peremptory sale of his stock was widely advertised. Allured by the reputation of his herd, several American gentlemen went over to witness it. The attendance of English breeders was very large, and the sales averaged higher prices in individual animals than had been reached since the famous sale of Charles Colling in 1810.



KERRY CATTLE.
Specially photographed for this work.

Mr. Samuel Thorne, of Dutchess county, N. Y., bought several of the best and highest priced animals, of the "Duchess" and "Oxford" tribes, and added to them several more choice ones, from different herds. Messrs. L. G. Morris, and the late Noel J. Becar, of New York, bought others of the "Duchess," and "Oxfords," to which they added more from other

choice herds. These "Bates" importations have since been bred so successfully by their holders here, that several young bulls and heifers have been purchased by English breeders, and sent over to them at good prices, where they are highly valued.

In 1852-3-4, several spirited companies were formed in Clinton, Madison, and other counties in Ohio, and in Bourbon, Fayette, and some other counties of Kentucky, and made importations of the best cattle to be found in the English herds, and after their arrival here, distributed among their stockholders. Mr. R. A. Alexander, of Kentucky, also, during those years, made extensive importations of choice blood for his own breeding, so that in the year 1856, it may be said that the United States possessed, according to their numbers, as valuable a selection of Short-Horns as could be found in England itself.

XI. Canadian Short-Horns.

Keeping pace with the States, a number of enterprising Canadians, since the year 1835, among whom may be named the late Mr. Adam Fergusson, Mr. Howitt, Mr. Wade, the Millers, near Toronto, Mr. Frederick Wm. Stone, of Guelph, and Mr. David Christie, of Brantford, in Canada West, and Mr. M. H. Cochrane and others in Lower Canada, have made sundry importations of excellent cattle, and bred them with skill and spirit. Many cattle from these importations, and their descendants, have been interchanged between the United States and Canada, and all may now be classed, without distinction, as American Short-Horns.

XII. Westward March of the Short-Horns.

In the West, the North-west and in the South-west, as fast as the settlement of the country allowed, the Short-Horns were every-where introduced, and within the last fifteen years, annual sales have been made at important cities and on the farms of the wealthier breeders, where the surplus stock is bid off at auction. These sales are attended by buyers from all parts of the country, especially by breeders from the newer settlements West, until now Minnesota, Nebraska, Kansas, Colorado and even the territory of Dakota, have most excellent herds of their own. In addition to this, Short-Horn bulls are shipped by the car-load to the great herding grounds of the far western plains to improve the stock there.

XIII. Short-Horns as Beef-Makers.

It is to be regretted that we no longer have the fine milking strains of Short-Horns, that were so abundant thirty years ago. Nevertheless, their places are amply supplied by the Jerseys, the Ayrshires and the Dutch Friesian or Holstein cattle

If the Short-Horns fail as milkers they have been wonderfully improved as beef-makers, and as wonderfully developed in point of early maturity, so that they are now produced ripe for the butcher at three years old, and are quite fit for killing at any age from yearlings up.

While they are wonderful as beef-makers, they certainly are the handsomest cattle, to the eye, of any in the known world. They have great thickness of carcass, and the prime points especially are full. The offal is no more than in ordinary steers that will not attain more than half their weight. They have been sneeringly called "the gentleman's steers." The breeding of them is certainly patronized by the wealthy, as objects of beauty, and butchers seem to be especially anxious to get the ripe ones for Christmas beef. In the older settled parts of the country there are few cattle but show more or less of this almost universally admired blood.

XIV. The Patton Family of Short-Horns.

Soon after the Revolutionary war, as already stated, cattle, supposed to have been pure-bred Short-Horns, were brought to Virginia. The progeny of some of these cattle were taken to Kentucky by a gentleman named Patton, from whence, in course of time, they became widely disseminated as Patton stock—a name which was even corrupted into "patent stock." This was not a misnomer however, since, as we knew them over forty years ago, they were heavy cattle, that ripened at an early age, for that day, and among them were many remarkable milkers. They were somewhat coarse as compared with the Short-Horns of to-day, but thick-meated, broad-loined, round-barrelled animals, good at the pail; and, on the butcher's block, they gave large carcasses of excellent beef.

XV. Grade Cows and Steers.

A report in the fifth volume of the "Transactions of Massachusetts," gives the well-authenticated statement of Mr. Robinson of Barre, from which we gather the following interesting facts: The cows under trial were half and three-quarters bred. Seven of them yielded, during the first seven days in June, 2,207 pounds of milk, averaging forty-five pounds per diem to each cow. From this milk 232 pounds of cheese was made, averaging one pound of cheese to nine and a half pounds of milk. The same cows gave during the three following days 955 pounds of milk, from which forty-one pounds nine ounces of butter were made, averaging one pound of butter to twenty-three pounds of milk. It will be seen that the milk that makes one pound of butter will make two and a half pounds of cheese. These cows had no extra feed during the trial, having been turned to pasture on the 15th of May. This instance is selected not as a very extraordinary performance, but as a well-authenticated and carefully-conducted experiment.

So far as the grade steers are concerned they are well known to be thrifty, easily-fed animals that mature fully a year in advance of the native cattle, from which they are in part descended.

XVI. Short-Horns Critically Described.

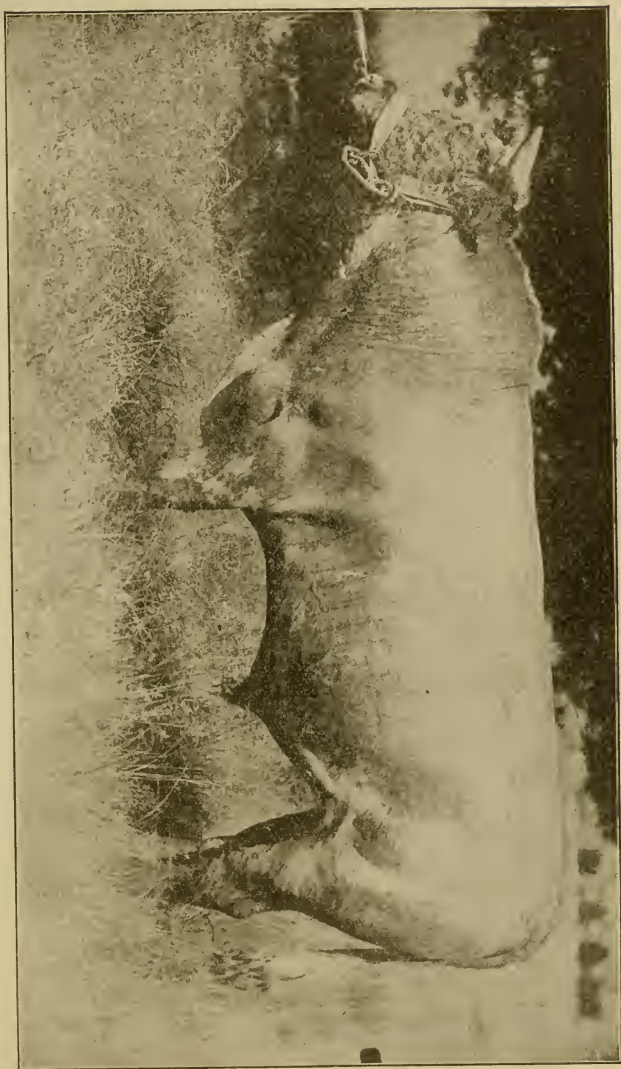
For a full and graphic description of all the points which go to make up a high-caste Short-Horn, there is no better authority than the writings of Mr. Rotch of New York, and Mr. A. C. Stevenson, formerly President of the Indiana Short-Horn Breeders' Association. By the aid of the careful analysis made by these critical judges, the many excellent and valuable qualities of the breed may be readily estimated. The majestic size, proud carriage and beautifully variegated colors of the Short-Horn render him easily recognized by the merest tyro. But few who thus admire and recognize them are aware how many qualifications go to make up this splendid whole, or how carefully each point has been weighed and discussed, and its relative value decided; how the useful parts are divided from the ornamental and fashionable, and how systematically the whole has been carried out.

XVII. The Head.

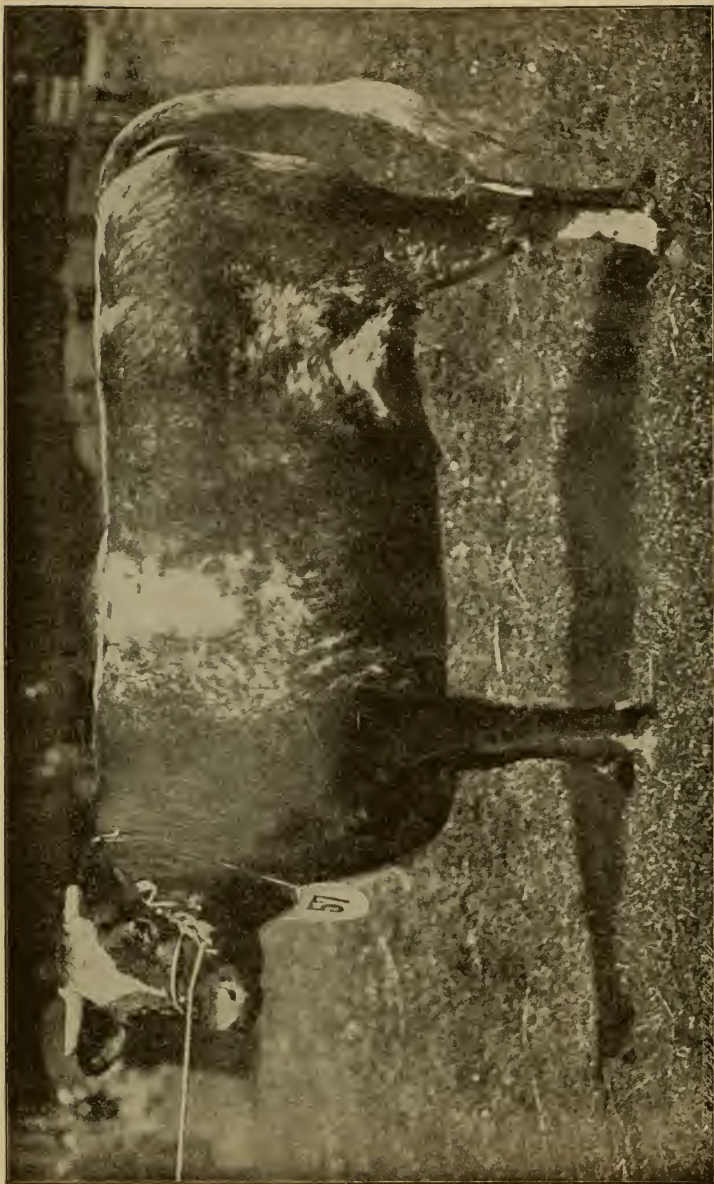
The high-caste Short-Horn should have a small head, a broad, flat forehead, with no projection of the frontal bones; the face should be well cut out below the eyes, tapering to a fine muzzle with open nostrils. The nose must be flesh or chocolate colored; any discoloration hinting towards black or blue is very objectionable, though occasionally seen in some of the highest bred families. The eye must be bright, prominent, and yet placid; a small, piggish or hollow eye, or one showing viciousness or nervousness, is alike to be avoided, the latter indicating a bad feeder almost invariably. The circle around the eyes should be of a bright yellow or flesh color. As a very large ear indicates sluggishness, one of medium size is preferable. The horns should be well set on, curving forward, not too heavy, and of a clear, waxy yellow color at the base, though this waxy color is not universally deemed essential—some claim that the horns should be flat.

XVIII. The Neck.

The neck is moderately long, clean in the throat, and running neatly into the shoulders, which should not be too prominent at the points, nor too wide at the top, else the crops will be certain to seem defective; they should mould nicely into the fore-quarters, and be well covered with flesh on the outside. The neck-vein should be well filled up with flesh and form on smoothly to the shoulder points. The chest must be broad and



BEST IMPORTED SHORTHORN BULL, "MATOPO,"
First Prize, Ladybrand Show,
The property of F. Style, Caledonsdraai.—Specially photographed for this work.



SHORT-HORN HEIFER, "BAPTON DAISY."

deep, and full back of the elbows, which secures a good girth and consequent room for the most important vital organs. The brisket should be full and broad rather than narrow and projecting; it is of inferior quality as beef, yet, as a point of beauty and as indicating a propensity to fatten, must not be overlooked. A thin, broad neck is sure to indicate weakness and poor feeding qualities. Animals having such may well be avoided as breeders.

XIX. The Body.

The body should be square, massive and symmetrical. The line of the back should be straight; the line of the belly nearly so, swelling a little behind the ribs; the flank low; the ribs barrel-shaped; the loins wide, and the rump long and wide. The back should be wide, and the thigh should be long and wide; the legs short and comparatively small, or at least not coarse; tail light; hair soft and fine. The color should be red or white, or a mixture of the two, as roan or pied. The body should be nearly a square. A very lengthy bullock never fattens so readily as a short one, for he does not possess all the elements of health and vigor in the same degree as the shorter and more compact animal.

XX. The Legs Short and Straight.

The body should be set on short legs which should be straight and well under the animal; the fore legs should be small in the bone below the knee, whilst the forearm must be broad and tapering downwards, fitting level into the girth; the hind legs must be nearly straight. If the hocks are too much bent, turn inward, or not well under the body, it not only gives an awkward gait in walking, but is generally a sign of weakness.

XXI. The Loin Broad.

The loin must be broad and well carried forward into the crops, and covered with thick flesh moulding nicely on to the hips, which though wide must not be too prominent, but slope away gradually to the rump or side bones at the tail. A quarter badly filled up between hips and rumps or scooped-out, as it is termed, is very objectionable. The back must be level from neck to tail, with no drops back of the shoulders, nor any rise where the tail is set on; the rumps must be well laid up but not too high, else when the animal is fat we shall have those large masses of fat aggregated about them so common among the breed some years since, but now deservedly stigmatized as bad. The twist should be well filled out in the seam, wide and deep, the outside thigh full, the flank deep, and forming with the fore-flank and belly (the latter well supported by its plates) a parallel line with the animal's back.

XXII. Wide in the Crops.

The animal broad in the crops has a better back ; but it is also evidence of a better rib beneath the shoulder-blade, giving greater width to the chest within, and consequently greater play to the lungs. This position of the shoulder-blade enables the legs to be brought more gracefully under the chest beneath. There are some beasts whose fore legs stand so wide apart that they very much resemble two sticks stuck into a large pumpkin. Such animals are considered awkward and inconvenient at least.

XXIII. The Back Straight and Broad.

A broad back affords valuable roasting pieces, and will be the delight of the butcher. The straight back affords a better spinal column, and gives the proper space to the cavities beneath, which, as we have just seen, are occupied by the most important organs. A straight line also gives to the ribs a more graceful as well as a more convenient attachment.

XXIV. The Ribs Barrel-Shaped.

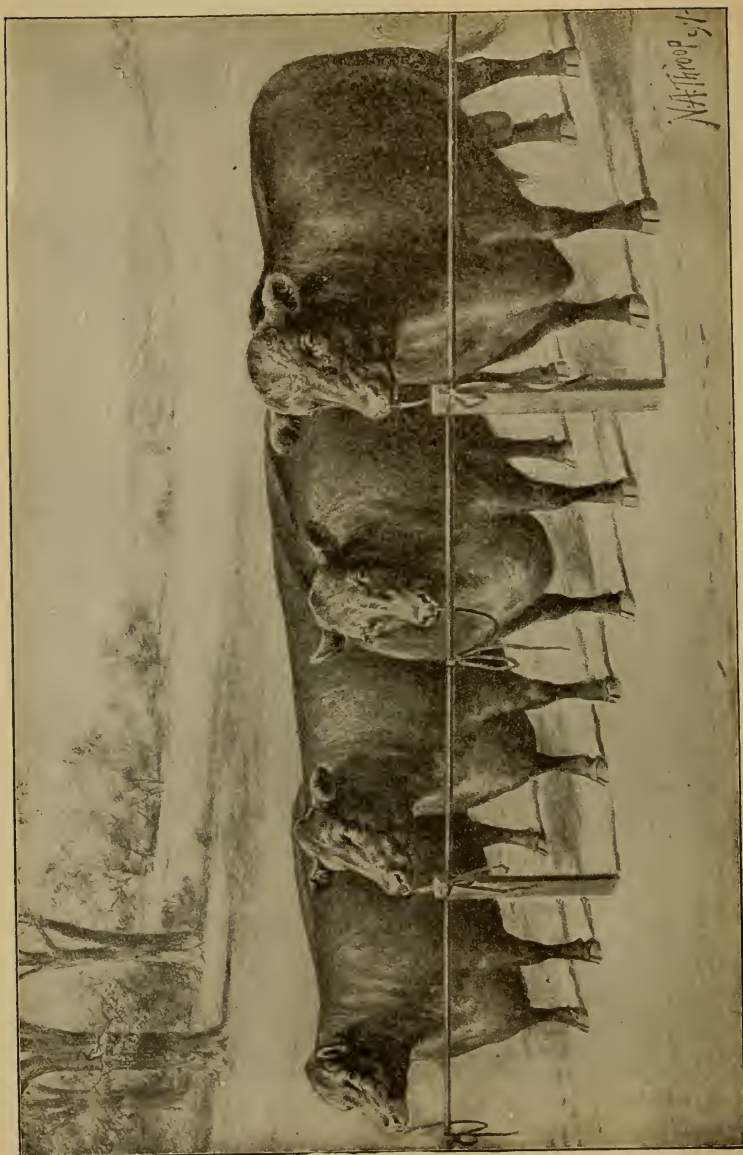
The ribs rising well from the spine, giving to the body a round or barreled shape, gives much more room to the organs within—the heart and lungs—than there would be if the ribs descended in such a manner as to give a flat side. A beast with flat sides, and consequently a narrow throat, will lack greatly in vigor and health, and all the essential qualities that constitute a good bullock. A bad rib gives poor space to the abdominal organs which lie immediately behind those of the chest, unless the belly is greatly sagged, which is generally the case.

XXV. The Touch.

By handling or the touch, butchers ascertain beforehand the quality of the flesh. By it the breeder ascertains the aptitude to fatten as well as the quality and quantity of flesh that the animal will carry. Of all the qualities of the ox, this is probably the most difficult to understand. It is the peculiar sensation of softness and elasticity that is produced by the pressure of the hand on different parts of the body. This sensation depends, in part, upon a large cellular development beneath the skin and between the muscles, and in part upon the muscular structure, adapting itself to the duties it has to perform. It is very common to find a softening of the muscular fibre as an accompaniment or a precursor of disease that may mislead. The same may be observed in the aged of both man and beast. What is 'touch,' or what is it to 'handle well?' How is it to be distinguished from that which portends bad health and old age? By its elasticity—its power to replace the parts when pressed—a springy sensation.



FOUR DAIRY COWS.



HEATHERTON HERD OF ABERDEEN-ANGUS CATTLE.



JERSEY BULL.
Many Times a Prize Winner as Indicated by Ribbons Shown. Sold for \$10,000.—Specially photographed for this work.

It will require much practice to become an adept in this knowledge. Still, many useful lessons may be daily had by the examination and handling of one's own stock. Comparative handling will afford much assistance. Take those animals that are known to accumulate fat readily and largely, as the opossum or the bear, or any other known to take on fat readily, and you will find a peculiarly soft and mellow 'touch.'

XXVI. The Hide.

The skin should be thick, soft and elastic—fitting alike either a poor or fat ox. A lean animal, with an inelastic skin stretched upon him, could not fatten for the want of space to expand in. But with an elastic skin he may be swelled to great dimensions in what seemed to be but a covering for his bones. The skin performs very important functions in the animal economy. It is not only a covering for all the parts beneath it, but it is the seat of a vast system of minute blood vessels and capillaries, of exhalents and absorbents. A vast nervous tissue centers here that renders the skin sensitive in the highest degree. The great vital worth and importance of the skin may be readily appreciated by any injuries done it. The rapidity with which extensive burns destroy life may serve as a sufficient illustration. "Destroy my skin, and you shall have my bones also."

XXVII. The Hair.

The hair should be thick, soft, mossy and fine, forming a protection against inclemencies of weather. Fine hair is an evidence of a finely organized skin, a skin exquisitely finished in its whole structure of minute vessels and tissues. A skin thus delicately organized is also evidence that other organs are alike constructed. Nature in all her parts undoubtedly produces a correspondence, so that if one part is of a peculiar structure, either fine or coarse, other parts are apt to correspond. Parts seen may be considered indicative of parts not seen. It may be permitted to add that in all the scrub cattle that I have grazed and fed, I have never found one with fine silky hair that did not fatten well and make a desirable bullock.

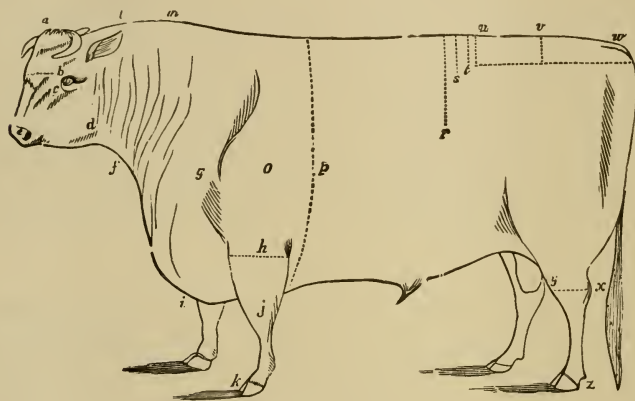
XXVIII. The Color.

As regards color, the latitude is very great, from deep blood-red through all the intermediate shades and mixtures to pure white, but any other colors, as brown, black or dun, are never met with in thorough-breds. Fashion has vindicated the rich red and purple roan as the most desirable colors, and after them red. White is sometimes objected to, under the impression that it is apt to spread through a herd and overpower the other colors; but this fear is more common in this country

than in England, where white bulls are often used. Red and white, in blotches, with defined edges not running into roan, is disliked, and the term patchy is applied to it. This discrimination, however, as regards color, is entirely arbitrary, animals of equal excellence and breeding being found of all these colors.

XXIX. Beef Points Illustrated.

In the accompanying outline illustration of the points of a Short-Horn bull the letters *a, b, c, d, f, h, m, j, k, x, y, z,* represent the inferior parts; from the girth *p*, back, including *r, s, t, u, v,* the superior parts.



POINTS OF SHORT-HORN BULL.

From this it will be easy to understand the points and the respective numbers given in the tabulated scale of points as authoritatively stated in the American Herd Book

XXX. Scale of Points for Short-Horn Bulls.

POINTS.

ART. 1.—Purity of breed on male and female side; sire and dam reputed for docility of disposition, early maturity and aptitude to fatten; sire a good stock-getter, dam a good breeder; and giving a large quantity of milk, or such as is superior for making butter or cheese. - - - - -

ART. 2.—Head muscular and fine; the horns fine and gradually diminishing to a point, of a flat rather than a round shape at the base, short and inclined to turn up, those of a clear, waxy color to be preferred, but such as are of a transparent white,

and tinged with yellow, admissable; ears small, thin and covered with soft hair, playing quick, moving freely; forehead short, broad, especially between the eyes, and slightly dished; eyes bright, placid and rather prominent than otherwise, with a yellow rim around them; lower part of the face clean, dished and well developing the course of the veins; muzzle small, nose of a clear orange or light chocolate color; nostrils wide and open; lower jaw thin; teeth clean and sound. - - 5

ART. 3.—Neck fine and slightly arched, strongly and well set on the head and shoulders, harmoniously widening, deepening and rounding as it approaches the latter point; no dewlap. - 2

ART. 4.—Chest broad, deep and projecting, the brisket on a lower line than the belly. - - - - - 5

ART. 5.—Shoulders broad, strong, fine and well placed; forelegs short, straight, and standing rather wide apart than narrow; fore-arm muscular, broad and powerful, slightly swelling and full above the knee; the bone fine and flat; knees well knit and strong; foot flat, and in shape an oblong semicircle; horn of the hoof sound and of a clear waxy color. - - - - 2

ART. 6.—Barrel round and deep, and well ribbed up the hips. - 4

ART. 7.—Back short, straight and broad from the withers to the setting on of the tail; crops round and full; loins broad; huckle bones on a level with the back; tail well set, on a level with the back, fine and gradually diminishing to a point, and hanging, without the brush, an inch or so below the hock, at right angles with the back. - - - - - 4

ART. 8.—Hind quarters from the huckle to the point of the rump well filled up; twist well let down and full; hind legs short, straight, and well spread apart, gradually swelling and rounding above the hock; the bone fine and flat below; legs not to cross each other in walking, nor to straddle behind. - - - 3

ART. 9.—Skin of medium thickness, movable and mellow; a white color is admissable, but rich cream or orange much preferable; hair well covering the hide, soft and fine, and if undercoated with soft, thick fur in winter, so much the better; color, pure white, red roan, bright red, or reddish yellow and white. (A black or dark brown nose or a rim around the eye, black or dark spots on the skin and hair decidedly objectionable, and indicative of coarse meat and bad blood.) - - - 5

ART. 10.—Good handling. - - - - - 4

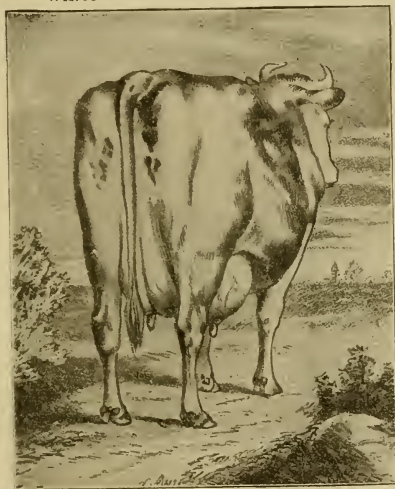
ART. 11.—Sure stock-getter. - - - - - 4

the back or very slightly below it; fine and gradually diminishing to a point; and hanging, without the brush, an inch or so below the hock, at right angles with the back. - - - 4

ART. 8.—Hind quarters from the huckles to the point of the rump long and well filled up. Twist well let down and full. Hind legs short, straight and well spread apart; gradually swelling and rounding above the hock; the bone fine and flat below. Foot flat, and in shape of an oblong semi-circle. Horn of the hoof sound, and of a clear waxy color. Legs not to cross each other in walking, nor to straddle behind. - - - 3

ART. 9.—Udder broad, full, extending well forward along the belly, and well up behind. Teats of a good size for the hand; squarely placed with a slight oblique pointing out; wide apart; when pressed by the hand the milk flowing from them freely. Extra teats indicative of good milking qualities, but should never be milked, as they draw the bag out of shape. Milk veins large and swelling. - - - 4

ART. 10.—Skin of a medium thickness: movable and mellow; a white color is admissible, but a rich cream or orange much preferable.



HOLLAND COW.

This cow is very large, docile in disposition, and a fine milker. The beef is also of an excellent quality. In Holland it is generally claimed that the shorthorns of England are descended from this cow.

Hair well covering the hide; soft and fine, and if undercoated with soft, thick fur in the winter, so much the better. Color pure white, red, roan, bright red, red and white, spotted roan, or reddish and yellow and white. (A black or dark brown nose, or rim around the eye, black or dark brown spots on the skin and the hair, decidedly objectionable, and indicative of coarse meat and bad blood.) - 3

ART. 11.—Good handler. - 4

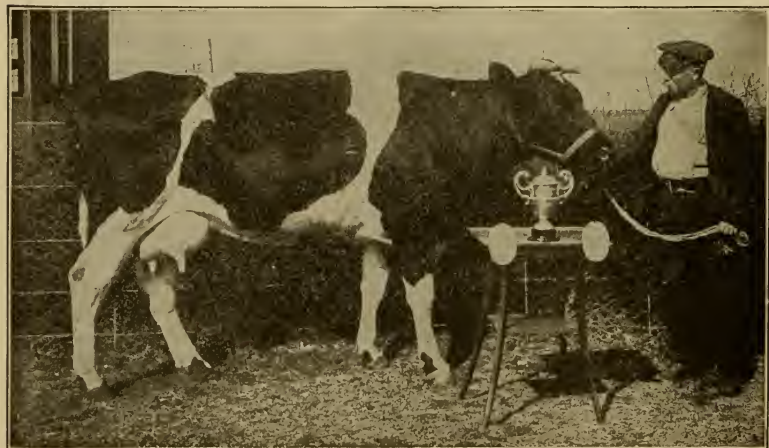
ART. 12.—Sure breeder. - 4

ART. 13.—General appearance. - - - 2

Perfection. - - - 50



FRIESIAN CALF "RASCAL." (Son of Palenstein IV.)
Age only four weeks when photographed. Bred by E. B. Moore, Esq., Rouxville, Transvaal, Africa. Specially photographed for this book.



FRIESIAN COW "PALENSTEIN IV."
Owned by E. B. Moore, Esq., Rouxville, Transvaal, Africa. She took 1st prize at Johannesburg Agricultural show for best Dairy Cow.—Specially photographed for this book.

CHAPTER VI.

THE JERSEYS, ALDERNEYS AND GUERNSEYS.

- I. A FASHIONABLE BREED.—II. THE GUERNSEYS.—III. THE ALDERNEY IN YOUATT'S TIME.—IV. THE JERSEY OF TO-DAY.—V. CROSSING THE JERSEYS.—VI. THE JERSEY DESCRIBED.—VII. MILK MIRRORS.—VIII. GUENON'S THEORY OF MILK MIRRORS.—IX. THEIR PRACTICAL UTILITY.—X. THE ESCUTCHEON MARKS.—XI. GOOD MILKERS IN ALL BREEDS.—XII. VALUE OF HEREDITY.—XIII. INFLUENCE OF GOOD DIGESTION AND ASSIMILATION.—XIV. THE MILK VEINS.—XV. THE UDDER AND TWIST VEINS.—XVI. MR. SHARPLESS' OPINION.—XVII. SYMMETRY ESSENTIAL WHATEVER THE BREED.—XVIII. THE JERSEY NOT A DAIRY COW.—XIX. SCALE OF POINTS FOR JERSEY COWS AND HEIFERS.—XX. RULES IN AWARDED PRIZES.—XXI. SCALE OF POINTS FOR JERSEY BULLS.—XXII. ESTIMATING THE VALUE OF POINTS.—XXIII. COLOR AND SIZE.—XXIV. FROM A PRACTICAL STAND-POINT.

I. A Fashionable Breed.

Within the last fifteen years, the Jersey, Alderney and Guernsey cattle, second in importance of the short-horned breeds of Great Britain, have acquired great celebrity, not so much for the quantity of the milk they give, as for its exceeding richness in cream, and the excellence of the butter made therefrom. Those originally brought from the islands of Jersey and Alderney are now called Jerseys, just as all Dutch cattle have been called Holsteins, while the Guernsey cattle are kept separate and distinct, under the proper name of the island from which they came.

II. The Guernseys.

While the Jerseys and Alderneys have the most admirers, especially among fashionable breeders, from their deer-like forms and general air of elegant lightness, the Guernseys are coming into prominence as being larger, better-built, (that is, not so angular,) and better feeders; for it must be confessed that the Jersey cow, for its size, is a great consumer.

The Guernsey cow is also a larger producer of milk, though it is averred by the Jersey breeders that it is not so rich in quality. Jersey cattle, however, vary much in this respect, and it is certain that the Guernsey cows are growing more and more into favor every year as butter and milk producing cows.

III. The Alderney in Youatt's Time.

Youatt says of this breed, which he classes with the cattle of Normandy, that they are from the French continent; that the cattle of Normandy are larger and have a greater tendency to fatten; that others are



JERSEY BULL, "GOLDEN HERO."

from the islands of the French coast, but that all of them, whether from the continent or islands, pass under the common name of Alderney. Youatt also adds, on the authority of Mr. Parkinson, who seems to have been a prejudiced observer, that, "The Alderney, considering its voracious appetite—for it devours almost as much as a Short-Horn—yields very little milk," but admits the milk to be rich in quality, though "it is not rich enough, yielding the small quantity she does, to pay for what it costs." If this be true, the Jersey has improved fully as much within the last fifty years as any other breed.

IV. The Jersey of To-Day.

Be the statements of the authorities quoted what they may, the Jersey of to-day is a very different animal from that which they describe. That the Jerseys are large feeders for their size there is no doubt, and that they give the richest milk of any known breed is quite as certain. That some of them, at least, give large quantities of milk, the following extract from the American Encyclopædia of Agriculture will show :

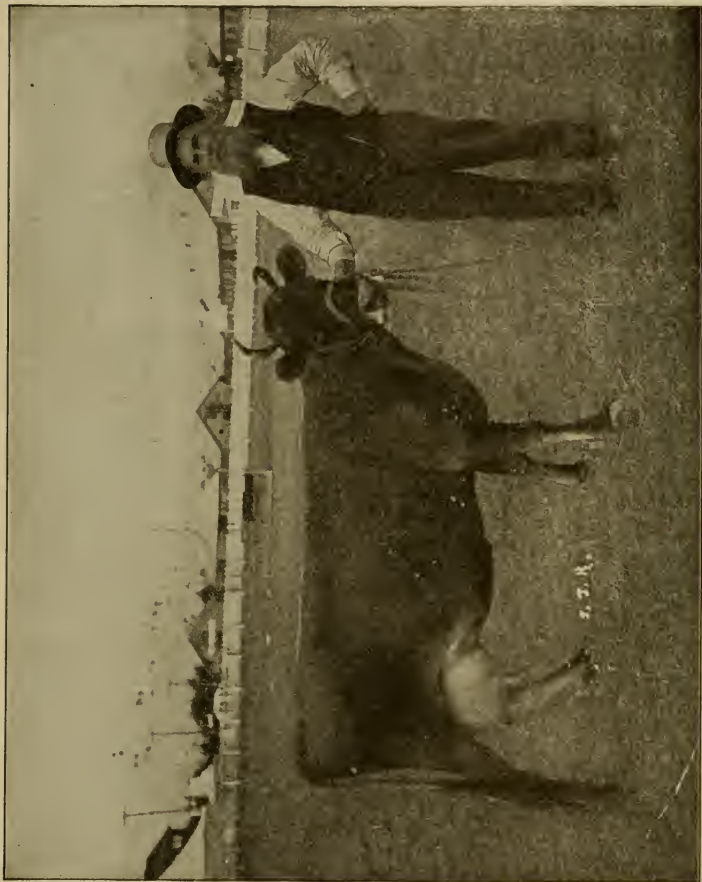
"The butter from the cows is very rich in cream and deep yellow in color, so much so that a few cows in a herd will decidedly change the color of the butter of the whole herd. The percentage of cream to milk varies from eighteen to twenty-five per cent., and the proportion of butter to cream varies from 3.70 to 8.07 in 100 parts. Twenty-six quarts per day has been recorded as the product of an individual cow, and fourteen pounds of butter per week. Sixteen quarts per day may be regarded as a good yield, and when we take into consideration the light weight of the cow, and the fact that the milk will yield from one-quarter to one-sixth of the richest cream, we need not wonder that these gentle and deer-like cattle have become universal favorites as family cows."

Our own observation is that twelve quarts a day may be considered a good average yield of milk, from the pure-bred animals—an average fully one-third more than that of good native herds.

V. Crossing The Jersey.

Crossing the Jerseys with other improved breeds has not resulted satisfactorily. Their value, however, is priceless when crossed upon good milkers from native herds. They have added largely to the quality of the milk of the inferior stock; and crosses of the Jersey bull upon the ordinary native cows of a district, have not only imparted richness to the milk, but have resulted in an increased flow. Their sole use is among those who wish exceedingly rich milk, and, whatever the strain, we think no advantage will be found in crossing them on any of the beef breeds. They are milking cattle, and their legitimate use is to supply the demands of people who want quality, and not quantity of milk.

The bulls may improve the native milking stock of the country, and whatever variety is used, whether those from the line of Jersey, Alderney or Guernsey, use only pure bulls. Do not take a grade bull at any price; those purely bred are now sufficiently plenty, so that they can be



JERSEY COW.

had at reasonable prices. The pure bulls are prepotent in perpetuating rich milking qualities. The grades are not. If an additional reason were wanted, please remember that the produce of a pure animal on one not of improved blood is a half-blooded calf. The produce of a half-blood on native cattle would be only one-quarter blood.

VI. The Jersey Described.

Mr. Lewis F. Allen, a conscientious and accurate historian of cattle, but who, it must be confessed, has something of a prejudice in favor of the (to him) favorite Short Horns, accurately describes the Jersey, as follows: "Beginning with the head—the most characteristic feature—the muzzle is fine; the nose either dark brown or black, and occasionally a yellowish shade, with a peculiar mealy light-colored hair, running up the face into a smoky hue, when it gradually takes the general color of the body. The face is slightly dishing, clean of flesh, mild and gentle in expression; the eye clear and full, and encircled with a distinct ring of the color of the nose; the forehead bold; the horn short, curving inward



GROUP OF JERSEYS.

and waxy in color, with black tips; the ear sizable, thin, and quick in movement. The whole head is original, and blood-like in appearance, —more so than in almost any other of the cattle race,—reminding one strongly of the head of our American elk. The neck is somewhat depressed—would be called ewe-necked by some—but clean in the throat, with moderate or little dewlap; the shoulders are wide and somewhat ragged, with prominent points, running down to a delicate arm, and slender legs beneath. The fore-quarters stand rather close together, with a thinnish, yet well developed brisket between. The ribs are flat, yet giving sufficient play for good lungs; the back depressed and somewhat hollow; the belly deep and large; the hips tolerably wide; the rump and tail high; the loin and quarter medium in length; the thigh thin and

deep; the twist wide, to accommodate a clean, good-sized udder; the flanks medium; the hocks or gambrel joints crooked; the hind legs small; the udder capacious, square, set well forward, and covered with soft, silky hair; the teats fine, standing well apart and nicely tapering; the milk veins prominent. On the whole she is a homely, blood-like, gentle, useful little housekeeping body, with a most kindly temper, loving to be petted, and, like the pony with the children, readily becomes a great favorite with those who have her about them, either in pasture, paddock, stable or the lawn. The colors are usually light red or fawn, occasionally smoky grey, and sometimes black, mixed or splashed more or less with white."

VII. Milk Mirrors.

To M. Francois Guenon, a farmer of Sibourne, France, is due the credit of having perfected a system for determining the value of a cow for milk, by the escutcheon or milk sign, (mirror as it is sometimes called) extending from the root of the tail, in the best animals, down over the udder behind and between the thighs. The writer studied it and lived by it when engaged in active farming, and, while not willing to accord full credit to the judgment of the French committee of agriculture at Bordeaux, in 1828, he believes them conscientious in their report. They used this strong language: "This system we do not fear to say is infallible." My own observation leads me to regard it as being so essentially correct, that a careful study of the "signs" will enable any person to judge pretty correctly as to the quantity and quality of the milk given and also as to the time of giving milk, after the cow is again in calf. In breeding, examine also the corresponding escutcheon in the bull, for we have always found that the bull showing the marks eminently will be pretty sure to get calves that will grow up to be good milkers.

VIII. Guenon's Theory of Milk Mirrors.

In the Guenon system there are twenty-seven diagrams representing the various grades of milking qualities, including what is called a bastard escutcheon to each grade. These vary from the fullest development in the growth of upward hair, and in the "scurf marks," down to the least possible exhibit—the "bastard escutcheons" showing, by peculiar signs, that the cow will not only give poor milk, but will fail early after again coming to be with calf. The hair indicating a good milker turns upward, is short and fine, and contains peculiar oval marks or scurf spots. The skin over this whole surface is easily raised, and is especially soft and fine in good milkers.

IX. Their Practical Utility.

To illustrate the value of the signs of a good milker, we give the results obtained by two close and intelligent observers, one a French authority, Prof. Magne, V. S., of the Veterinary School at Alfort, the other Mr. Charles Sharpless of Pennsylvania. In relation to the indications Prof. Magne, differing somewhat from Mr. Guenon, lays down the following rules :

“ The direction of the hair is subordinate to that of the arteries ; when a large plate of hair is directed from below, upwards on the posterior face of the udder, and on the twist, it proves that the arteries that supply the milky system are large, since they pass backwards beyond it, convey much blood, and consequently give activity to its functions. Upper tufts, placed on the sides of the vulva, prove that the arteries of the generative organs are strongly developed, reach even to the skin, and give great activity to those organs. The consequence is, that after a cow is again with calf, it draws off the blood which was flowing to the milky glands, lessens, and even stops the secretions of milk.

“ In the bull, the arteries, corresponding to the mammary arteries of the cow, being intended only for coverings of the testicles, are very slightly developed ; and there, accordingly, the escutcheons are of small extent.

X. The Escutcheon Marks.

“ This explanation, which accords very well with all that has been observed, renders it easy to comprehend the value of the escutcheon. The more the lower ones are developed, the greater the quantity of milk ; but shape is of consequence.

“ But the quantity of milk, and its quality, do not depend solely on the form and size of the escutcheon ; they depend on the food, the particular management, the climate, the season, the temperament, the size and energy of the principal internal organs, the capacity of the chest, the influence of the generative system, etc. All these circumstances cause the quantity of milk to vary, without making any change on the extent of the escutcheon ; consequently, it is impossible that the same relation can always exist between the escutcheons and the quantities of milk. We often see cows equally well shaped, having exactly the same escutcheon, and placed under the same hygienic condition, yet not giving equal quantities, or equal qualities of milk. It could not be otherwise. Assuming that a given tuft has the same value at birth, it cannot be the same in adult age ; since, during life, an infinite number of circumstances occur to diversify the activity of the milky glands, without changing the figure or size of the tuft.

“But the escutcheon has the advantage of furnishing a mark which can be easily discerned and estimated, even by persons of no great experience in the selection of cows—a mark perceptible on very young animals, and on bulls as well as heifers—a mark which, when disencumbered of the complicated system in which it has been wrapped up, will be in common use and facilitate the increase of good cows, by not allowing any but those of good promise to be reared.”

XI. Good Milkers in all Breeds.

Professor Magne also gives the following directions for choosing a good cow, of any breed:

“We find good milkers in all breeds, but they are rare in some and very common in others. It could not be otherwise. Milk properties, depending on the conditions which determine the formation of breeds, are due partly to the climate, the soil, the air, and the plants of the countries where the breeds have originated; and must therefore vary with the conditions peculiar to each locality. Milkers, and more especially animals intended for breeding, must be selected among breeds celebrated for abundance of milk. For as milking qualities are in a great measure dependent on structure and temperament, which are more or less hereditary, descent exercises a great influence.

XII. Value of Heredity.

“In each breed, therefore, we should choose individuals belonging to the best stock, and the offspring of parents remarkable for their milking qualities; for it is certain that good milch cows produce others which resemble them. A cow of a bad milking family, or even breed, may occasionally be an excellent milker, and more than this is not wanted when it is not meant to breed from her. The same cannot be said when breeding is intended, because there would be little chance of her transmitting the accidental or exceptional qualities possessed by her; whereas the qualities forming the fixed and constant characters of the stock would almost to a certainty be transmitted to descendants.

“These remarks, with regard to breed and parentage, apply to the selection of the bull, which, as experience demonstrates, acts like the cow in transmitting the milking qualities which distinguish the breed and stock.

XIII. Influence of Good Digestion and Assimilation.

“The digestive organs have a great influence on the exercise of all the functions, and particularly on the secretion of the milk-glands. Where the digestive organs are defective, good milch cows are rarely met with.

Good digestive organs are known by a belly of moderate size, with yielding sides, free from tightness, (in aged animals the belly is often large, though the organs which it contains are in good condition); a large mouth, thick and strong lips, a good appetite, easy and quick digestion, glossy hair, supple skin, yet firm, and somewhat oily to the touch. Animals possessing these characteristics may be expected to feed and drink heavily, and, if they are properly fed, make much blood and yield large quantities of milk. The respiratory organs complete the system of nutrition. The lungs bring the air breathed into contact with the blood, and render the system of nourishment complete. Hence, a good form, quick digestion and a healthy condition of the lungs are necessary to the production of a large flow of milk.

XIV. The Milk Veins.

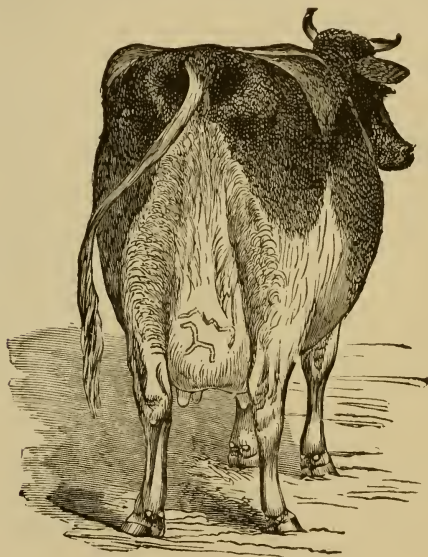
“If the veins which surround the udder are large, winding, and varicose (dilated at intervals), they show that the glands receive much blood, and, consequently, that their functions are active, and that the milk is abundant. The veins on the lateral parts of the belly are most easily observed, and all authors decide them to be among the best tests for ascertaining the activity of the glands. These veins issue from the udder, in front, and at the outer angle, where they form, in very good cows, a considerable varicose swelling. They proceed toward the front part of the body, forming angles, more or less distinct, often divide towards their anterior extremity, and sink into the body by several openings. We can make the size of the milk veins prominent by compressing them in their passage, by pressing them at the place where they penetrate into the body. If we press the thumb strongly into the opening through which the vein passes, the width of the opening represents the diameter of the vein, and the thickness of the thumb which stops it represents the volume of blood whose place it occupies. Sometimes the veins are divided. It is then necessary to examine all the openings by which they pass, in order to form a correct estimate.

XV. The Udder and Twist Veins.

“The veins of the udder and twist are able to furnish valuable indications. They should, in both cases, be highly developed, large and varicose; that is, appear swollen and knotty. The veins of the udder have no definite direction. They present themselves irregularly, with zigzag lines, knotted and more or less oblique. They are never of very large size, except in cows that give large quantities of milk.

“The veins of the twist directed from above downward, forming a winding line, interspersed with knots, resemble those of the udder in not being visible either in heifers or in cows of only fair milking quality. We

cannot ascertain their presence in any but very good cows. Of all the marks of abundant milk secretion, the best, and in fact the only infallible marks, are furnished by the veins of the twist and of the udder. To estimate them correctly it is necessary to take into account the state of the cow in respect to flesh, the thickness of skin, food, ability to stand fatigue, heat; all the circumstances, in fact, which cause variations in the general state of the circulation, and in the dilation of the veins. It is necessary, moreover, to recollect that in both sexes all the veins are larger in the old than in the young; that the veins which encircle the udder are those which, if the cows are in milk, vary most according to the age of



GREAT MILK MIRROR ON HOLSTEIN COW.

the animal. Small when the animal is young, they continue to increase in size until after the cow has had several calves, when they come to their full development.

“This proportion between the size of the veins and the milk secreted, is observed in all females without exception. The size of the veins and their varicose state being due to the blood attracted by the increased activity of the milk-glands, is not only the sign, but also the measure, of this activity—this connection. In fact, this connection is so close that, if the glands do not give an equal quantity of milk, the larger veins are on the side of the udder which gives the largest quantity.



STANDARD BROWN SWISS CATTLE.
Prize Winning Group.—Specially photographed for this work.

“The length of time during which milk is given corresponds with the activity of the organs which supply it. Cows which give most milk a day, also give it the longest; and hence, if no special mark is perceived, we can judge much of the duration of milk by the marks which determine its quantity. It may therefore be accepted that as a rule an abundant milker may be expected to give a long continued flow of milk.”

In illustration of what Prof. Magne says of milk mirrors in all breeds, we give an illustration of a wonderful milk mirror on a Holstein cow, corresponding to the best escutcheon of Mr. Guenon, which he names the Flanders, and which as is well known is one of the Dutch breeds.

XVI. Mr. Sharpless' Opinion.

Mr. Charles L. Sharpless of Pennsylvania, a careful breeder of Jersey cattle, and a close observer in relation to milk mirrors, holds the following:

There is no point in judging a cow so little understood as the escutcheon. The conclusion of almost every one is, that her escutcheon is good, if there be a broad band of up-running hair from the udder to the vulva, and around it. These cows with the broad vertical escutcheon are nearly always parallel cows; that is, with bodies long but not large, and with the under line parallel with the back. Their thighs are thin, and the thigh escutcheon shows on the inside of the thigh rather than on its rear.

Next comes the wedge-shaped cow, with the body shorter but very large, deep in the flank, and very capacious. This form does not usually exhibit the vertical escutcheon running up to the vulva, but with a broader thigh may exhibit a thigh escutcheon, which is preferable to the other; see Fig. 2.—Milk Mirrors of Jersey Cows, on the next page.

In both vertical and thigh mirrors, where the hair runs down, intruding on the udder (as low as above the dotted lines) as in Figs. 3 and 4, it damages the escutcheon. If you find a cow with the hair all running down, and between the thighs—that is, with no up-running hair—stamp her as a cipher for yielding milk.

There are times when the udder of a cow with an escutcheon like Fig. 4 will be enlarged by non-milking, for the purpose of deception. It is always safer to judge by the escutcheon rather than by the large size of the udder.

The escutcheons of the best cows—those yielding the most and continuing the longest—will be found to be those which conform to Fig. 2.

The vertical escutcheon of Fig. 1 would not injure it; but if that ornamental feature has to be at the expense of the high escutcheon, Fig. 2 is best as it is.

Whenever an escutcheon is accompanied by a curl on each hind-quarter of the udder, it indicates a yield of the highest order.

So far, we have noticed only the rear escutcheon, or that which represents the two hind quarters of the udder. The two front quarters are just as important, and should be capacious and run well forward under the body. If the udder in front be concave, or cut up, indicating small capacity, it represents reduced yield.

This front or level escutcheon is distinctly marked in the young heifer or bull, and can be seen by laying the animal on its back. The udder

FIG. 1.

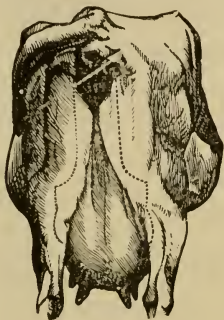


FIG. 2.

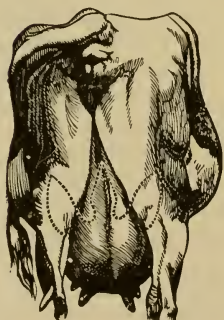


FIG. 3.



FIG. 4.

MILK MIRRORS OF JERSEY COWS.

hair under the body all runs backward, commencing at the forward line of the escutcheon. This dividing line is very perceptible, from the fact that the hair in front of it all runs forward towards the head of the animal, while the escutcheon, or udder hair, all runs backward, over the forward quarters of the udder, around and beyond the teats, and ceases at the markings of the rear escutcheon on and between the thighs.

The breadth and extent forward of this front escutcheon indicates the capacity in the mature animal, of the front quarters of her udder. In some cases this front escutcheon will be found of twice the extent that it is in others, and is evidence of that much more yield.

This examination enables one to see the size of the teats and their distance apart, and to test the looseness and softness of the udder skin. It is marked precisely the same in bulls, and can be easily examined at any age between one and ten months.

Many think that the escutcheon of the bull is of little moment, so that he has a good look. So far is this from being the case, that a bull with a mirror like Fig. 4, or worse, will stamp his escutcheon on, and to that extent damage, his daughters out of cows with escutcheons as choice as



GUERNSEY COW, CASSIOPEIA.

Fig. 2. In this way the daughters of some of the best cows come very ordinary, while, if you use a bull marked like Fig. 2, he will make a poor escutcheon better, and will improve the best. His injury or benefit will be doubled according to the escutcheon markings under the body in front of his scrotum. Hence the importance of the dam of a bull being unexceptionable in her udder and escutcheon. Her qualities inherited by her son will be transmitted to his daughter.

While careful as to escutcheons, we must not neglect the other essential features of a good cow—the back, skin, hide, the rich colored skin, and the fine bone. Let the hair be soft and thickly set, and let the skin be mellow. This latter quality is easily determined by grasping between the thumb and forefinger the skin at the rear of the ribs, or the double thickness at the base of the flank that joins the stifle-joint to the body, or that

on the inside of the rump-bone at the setting on of the tail. Let the teats be well apart; let them yield a free and full stream and be large enough without the necessity, in milking, of pulling them between the thumbs and forefingers. And let us ever keep in mind that the large yielders must be well fed.

XVII. Symmetry Essential Whatever the Breed.

In estimating the value of a breed its characteristics must be studied. Each breed has its peculiar style and conformation, and thus, symmetry, which is found in all good stock, will vary in different breeds. The Jersey has a standard of symmetry peculiarly its own, which we illustrate by



JERSEY COW LASKA.

two engravings, one of a heifer, the other of a cow, which fairly exhibit the characteristics of the breed.

The symmetry of the Jerseys is angular. They are essentially fine in the head, with thin necks and rather light fore-quarters, but with large, barrel-shaped bodies, inclined to be flat, rather than round, and swelling behind into the deep but rather thin thighs. This same conformation will be found measurably in all milking breeds, but modified, each having its own peculiar symmetry.

The Jerseys are essentially milking cows and nothing else, although they fatten rather kindly when past milking; but the beef is neither superior in quality nor large in quantity.

XVIII. The Jersey not a Dairy Cow.

In the strict sense of the word the Jersey is not a dairy cow. She is essentially the cow for rich milk, but not a cheese-maker; she lacks size to give quantity in this respect. The butter globules are not only larger than in other breeds, but the covering—the film enveloping the fat-globules, is weaker. Hence the globules give up the butter easily in churning. The cream is also high-colored from the excess of yellow pigment it contains.

For the family requiring milk rich in cream and butter, the Jerseys will always be desirable, and, since they have taken kindly to our climate in nearly every section of the union, and even in Canada, they have from their docile and tractable dispositions become universal favorites where kindly treated. The bulls are not always good-tempered, and hence require not only a firm hand, but careful management; and the cows, if abused, will by no means fail to resent the brutal treatment.

XIX. Scale of Points for Jersey Cows and Heifers.

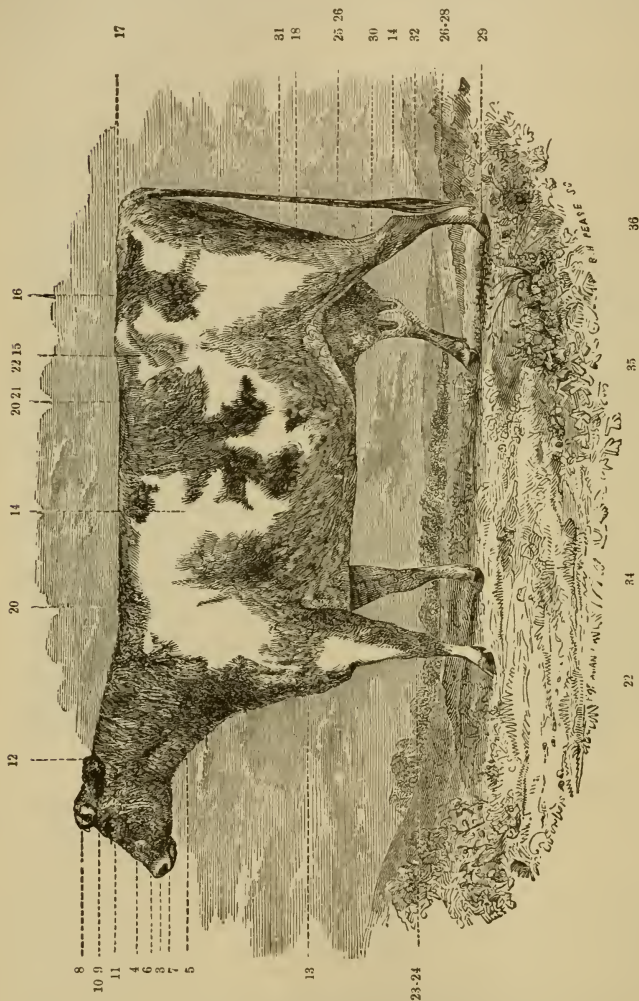
The scale of points adopted by the Royal Agricultural and Horticultural Society of Jersey, and by which all animals of the breed are now judged is as follows. It will be the more readily understood if studied in connection with the accompanying illustration of a model Jersey cow figured for perfection. Here is the scale:

ARTICLE.	POINTS.
1. HEAD,—small, fine and tapering.....	1
2. CHEEK,—small.....	1
3. THROAT,—clean.....	1
4. MUZZLE,—fine, and encircled by a bright color.....	1
5. NOSTRILS,—high and open.....	1
6. HORNS,—smooth, crumpled, not too thick at the base, and tapering....	1
7. EARS,—small and thin.....	1
8. EARS,—of a deep orange color within. ..,.....	1
9. EYE,—full and placid....	1
10. NECK,—straight, fine, and placed lightly on the shoulders.....	1
11. CHEST,—broad and deep.....	1
12. BAREL,—hooped, broad and deep.....	1
13. Well ribbed home, having but little space between the last rib and the hip.	1
14. BACK,—straight from the withers to the top of the hip.....	1
15. BACK,—straight from the top of the hip to the setting on of the tail, and the tail at right angles with the back.....	1
16. TAIL,—fine.....	1
17. TAIL,—Hanging down to the hocks.....	1
18. HIDE,—thin and movable, but not too loose.....	1
19. HIDE,—covered with fine, soft hair.....	1
20. HIDE,—of good color.....	1
21. FORE-LEGS,—short, straight and fine.....	1
22. FORE-ARM,—swelling, and full above the knee.....	1
23. HIND-QUARTERS,—from the hock to the point of the rump well filled up	1

ARTICLES.

POINTS.

24. HIND-LEGS,—short and straight, (below the hocks) and bones rather fine. 1
 25. HIND-LEGS,—squarely placed, not too close together when viewed from behind ----- 1



POINTS IN JERSEY SCOR-CARD ILLUSTRATED.

26. HIND-LEGS,—not to cross in walking ----- 1
 27. HOOFs,—small ----- 1
 28. UNDER,—full in form, i. e., well in line with the belly ----- 1

ARTICLE.	POINTS.
29. UDDER,—well up behind.....	1
30. TEATS,—large, squarely placed; behind wide apart.....	1
31. MILK-VEINS,—very prominent.....	1
32. Growth.....	1
33. General appearance.....	1
34. Condition.....	1
Perfection.....	34

XX. Rules in Awarding Prizes.

No prize shall be awarded to cows having less than twenty-nine points.

No prize shall be awarded to heifers having less than twenty-six points.

Cows having obtained twenty-seven points, and heifers twenty-four points, shall be allowed to be branded, but cannot take a prize.

These points, namely, Nos. 28, 29, and 31, shall be deducted from the number required for perfection in heifers, as their udder and milk-veins cannot be fully developed; a heifer will, therefore, be considered perfect at thirty-one points.

To which we add:

One point must be added for pedigree on male side.

One point must be added for pedigree on female side.

Again, the size of the escutcheon, or milk-mirrors, is a point of especial attention, for the escutcheon is now coming to be accepted as an indication of the milking qualities of a cow, and, whatever the breed may be, strongly relied upon. And those who discard it, that is, refuse a cow with a strong escutcheon, will surely go estray.

XXI. Scale of Points for Jersey Bulls

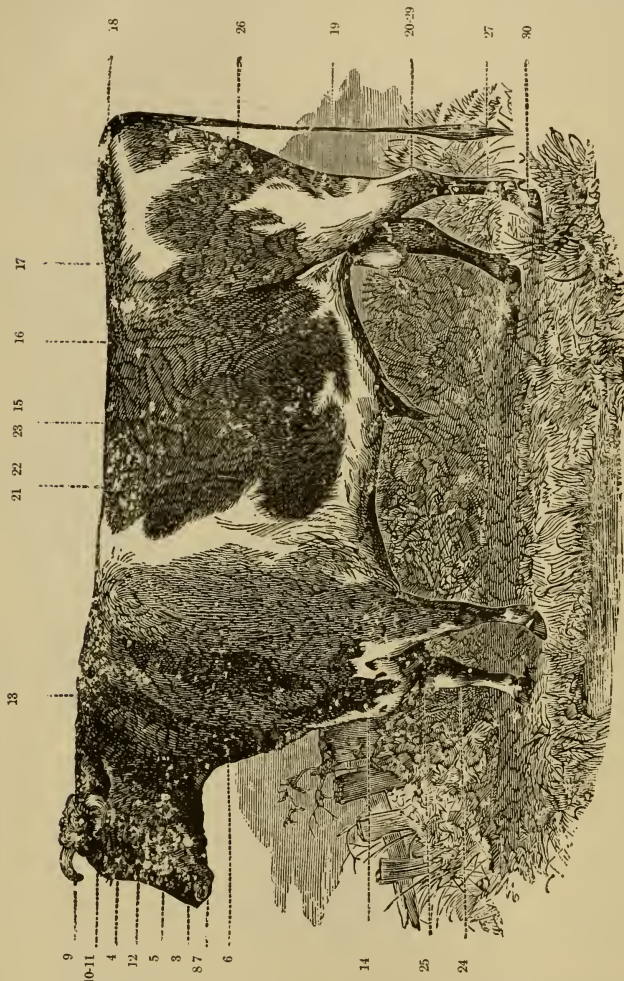
In judging bulls a somewhat different standard is adopted, and the same rule will apply in all cattle with proper variations, according to breed. The illustration of a Jersey bull, figured for perfection, will assist in understanding the scale of points. Here is the scale:

ARTICLE.	POINTS.
1. PEDIGREE on male side.....	1
2. PEDIGREE on female side.....	1
3. HEAD,—fine and tapering.....	1
4. FOREHEAD,—broad.....	1
5. CHEEK,—small.....	1
6. THROAT,—clean.....	1
7. MUZZLE,—fine and encircled with light color.....	1
8. NOSTRILS,—high and open.....	1
9. HORNS,—smooth, crumpled, not thick at the base and tapering, tipped with black.....	1
10. EARS,—small and thin.....	1
11. EARS,—of a deep orange color within.....	1
12. EYES,—full and lively.....	1

ARTICLE.

POINTER.

- | | | |
|-----|--|---|
| 13. | NECK,—arched, powerful, but not coarse or heavy..... | 1 |
| 14. | CHEST,—broad and deep | 1 |
| 15. | BARREL, hooped, broad and deep | 1 |



POINTS IN JERSEY SCOR-CARD ILLUSTRATED.

- | | | |
|-----|--|---|
| 16. | Well ribbed home, having but little space between the last rib and the hip | 1 |
| 17. | BACK,—Straight from the withers to the top of the hip | 1 |

	POINTS.
18. BACK ,—straight from the top of the hips to the setting on of the tail, and the tail at right angles with the back.....	1
19. TAIL ,—fine	1
20. TAIL ,—hanging down to the hocks.....	1
21. HIDE ,—thin and movable.....	1
22. HIDE ,—covered with fine and soft hair	1
23. HIDE ,—of a good color	1
24. FORE-LEGS ,—short, straight and fine.....	1
25. FORE-ARM ,—large and powerful, swelling and full above the knee, and fine below it.....	1
26. HIND-QUARTERS ,—from the hock to the point of the rump long and well filled up.....	1
27. HIND-LEGS ,—short and straight, (below the hocks) and the bones rather fine.....	1
28. HIND-LEGS ,—squarely placed, not too close together when viewed from behind.....	1
29. HIND-LEGS ,—not to cross in walking.....	1
30. HOCKS ,—small	1
31. Growth	1
32. General appearance	1
33. Condition	1
Perfection.....	33

XXII. Estimating the Value of Points.

The proper estimation of the value of the several parts of an animal has been publicly given by high authority in such matters, the *Jersey Herd Book*. The gist of which is as follows:

The highest excellence of any milking cow lies in the udder. This must not only be full in form, that is, in line with the belly, but it must not be cut off square in front, like that of a goat. It should be rounded, full, presenting great breadth behind, and carried well up between the thigh. The milk veins should be full and carried well forward toward the fore legs. If knotted and with curves, so much the better.

The tail is another essential point. Whatever its size at the root, it *must* be large and tapering, and have a good switch of hair.

The chest should be broad and deep; this shows good respiration, essential to feeding and health. But in the dairy cow, especially when viewed from before, there will be no appearance of massiveness. On the contrary, she will give an appearance of delicate fineness, and will look large behind, swelling gradually from behind the shoulders. She may not be closely ribbed, in fact should not be close, only comparatively so. The best milkers, every where, will be found to be rather loosely put together between the last rib and the hips, and good milkers must be roomy in the flank.

The hind quarters must be long from the point of the rump to the hock, and well filled up; yet this does not mean rounded and massive in

flesh ; on the contrary, the best milkers will be rather lean and perhaps high boned. Nevertheless, the same animal, when out of milk and fat, may fill up ; and perhaps, present a fully rounded contour, while yet possessing all the delicacy of points characteristic of the high-bred dairy cow.

A cow may have large and heavy ears ; her back may not be fully straight from the withers to the top of the hips ; her rump may be sloping ; her tail may not reach the hocks ;—all these are defects, the latter a serious one, yet if the milking organs are super-excellent it will outweigh all these.

A phenomenon may show absolute perfection in all the points : we have never yet seen such an one. In judging, the essentials are to carefully consider each point of excellence with reference to its bearing upon the animal as a dairy cow.

XXIII. Color and Size.

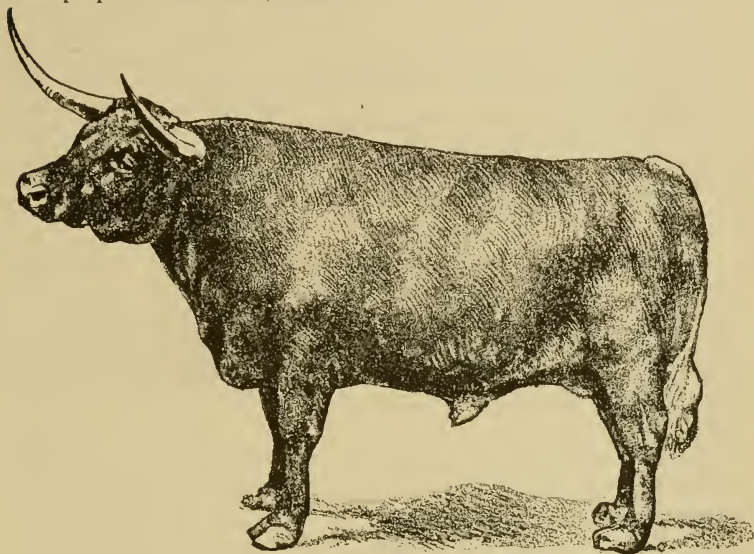
Do not be too particular about color ; solid colors, and black points look well in the show ring. The animal that will turn out well at the pail, that is docile and gentle, be she what color she may, so long as she adheres to the distinguishing color-marks of the race, is the one for the milking yard. In relation to size, the Jerseys are a small race of cattle. In no breed are overgrown animals the most valuable. With the Jersey it is especially to be avoided. So, an undersized animal is not to be countenanced. Fair size, however, is desirable. He who seeks to increase the size of the Jersey unduly, will certainly go astray. They have been carefully bred, for many generations, with especial reference to milk. The Jersey is the product of islands peculiar in soil, climate, and people. Transplanted to the flush pastures of the United States, with good shelter in winter, they will necessarily increase in size. If you fancy “solid colors,” and can get plenty of rich milk, with solid colors, well and good. If not, breed to whatever color, characteristic of the breed, which will give you this desirable result.

We have chosen thus explicitly to state, from competent authorities, the Jersey standard of perfection—first, for the reason that any breed should be judged by the standard of its breeders, and secondly, because these statements can only be found originally in the herd books, and like authoritative publications which are not accessible to the majority of readers.

XXIV. From a Practical Stand-point.

From the practical stand-point of a person not a breeder of high-caste animals, the writer has found that slight imperfections, in the make up of farm animals, do not militate against them unless they are intended as

breeders of pure stock of the highest type. In fact, few animals of a breed attain perfection closely, and almost none absolutely, according to the standard. As a milking cow, a Jersey or cow of other milking breed might be of the best possible standard and yet fail essentially in some other important points. Such a cow would be just as valuable for the one purpose of milk as the best.



WELSH OX.

This is a very fine breed of longhorn cattle. Their color is generally black, with occasionally a few white hairs in the coat. The docility of the breed is remarkable. When no bull is present, a stranger may go with perfect safety into the midst of any herd. The cows are very profitable as milkers and butter-makers, yielding a net profit of \$120 to \$180 per cow annually.

So in any other particular the person, whether he be a breeder or simply a fancier, must study the characteristics and the points of an animal, and then make up his mind whether in the one case it is worth the money asked for it, or in the other case whether it would be more profitable to sell rather than to keep.

CHAPTER VII.

MIDDLE-HORNED CATTLE—THE HEREFORDS.

- I. THE VALUABLE BREEDS OF MIDDLE-HORNS.—II. THE HEREFORD COLOR.—III. THE HEREFORDS FIFTY YEARS AGO.—IV. YOUATT'S TESTIMONY.—V. THE HEREFORDS IN AMERICA.—VI. THE IMPORTATION OF 1840.—VII. HEREFORD GRADES FORTY YEARS AGO.—VIII. THE OHIO IMPORTATION.—IX. HEREFORDS IN CANADA.—X. EARLY IMPORTED HEREFORDS NOT FAIRLY TRIED XI. THE HEREFORDS WEST.—XII. THE HEREFORD AS A WORK OX.—XIII THE HEREFORD COW.—XIV. POINTS OF THE HEREFORD.—XV. THE HEREFORD OF TO-DAY IN ENGLAND.—XVI. HIGH AND AUTHORITATIVE PRAISE.—XVII. DISTRIBUTION IN THE SOUTHWEST AND FAR WEST.

I. The Valuable Breeds of Middle-Horns.

The only valuable breeds of the Middle-Horns, in the United States, are the Herefords and the Devons, which will be treated of in this chapter and the next. They are essentially beef and working breeds. Their milking qualities were never more than moderately developed, and these qualities by continued breeding for beef, (for which they are unexceptionable,) have been so bred out, that but little now remains in them valuable for milk.

The natural history of these breeds was noticed in Chapter I, and it will not be necessary to refer to it, further than to say of the Herefords that, originally named from the country of Hereford, England, where, and in adjacent counties, similar cattle have been bred for hundreds of years, few, if any, of the popular beef breeds have shown more wonderful improvement within the last fifty years.

II. The Hereford Color.

Originally red or brown without white, the Herefords bred to brownish or yellowish red, and even brindled. Within about the last 100 years their faces became white or mottled-white, until finally the distinctive white of the face was made to extend along the top of the neck, and along the throat, dewlap, brisket, belly, and flanks, and they are now fashionably bred with the addition of white legs, and the switch of the tail white, the rest of the animal being of a uniform red color.

III. The Herefords fifty years ago.

Mr. Marshall writing of them as they existed in England fifty years ago, and as then improved, describes them thus: "The countenance pleasant, cheerful, open; the forehead broad; eye full and lively;

horns bright, taper, and spreading; head small; chap lean; neck long and tapering; chest deep; bosom broad, and projecting forward; shoulder-bone thin, flat, no way protuberant in bone, but full and mellow in flesh; chest full; loin broad; hips standing wide, and level with the chine; quarters long, and wide at the neck; rump even with the level of the back, and sharp above the quarters; tail slender and neatly haired; barrel round and roomy; the carcass throughout deep and well spread; ribs broad, standing flat and close on the outer surface, forming a smooth, even barrel; the hind parts large and full of strength; neck bones snug, not prominent; thigh clean, and regularly tapering; legs upright and short; bone below the knee and hock small; feet of middle size; flank large; flesh every where mellow, soft, and yielding pleasantly to the touch, especially on the chine, the shoulder and the ribs; hide mellow, supple, of a middle thickness, and loose on the neck and huckle; coat neatly haired, bright, and silky; color, a middle red; this, with a bald face, is characteristic of the true Hereford breed."

IV. Youatt's Testimony.

In Youatt's day they were the peers of the Short-Horns, and to-day they compare favorably with that famous breed, and take an equal share of prizes with them in our best exhibitions and fairs. They fatten, said Mr. Youatt, to a much greater weight than the Devons, and run from fifty to seventy score; a tolerable cow will average from thirty-five to fifty score (1000 pounds); a cow belonging to the Duke of Bedford weighed more than seventy; an ox of Mr. Westcar's exceeded one hundred and ten score (2,200 pounds). The Hereford ox fattens speedily at an early age. They are not now much used for husbandry, although their form adapts them for the heavier work, and they have all the honesty and docility of the Devon ox, and greater strength, if not his activity. The Hereford cows are worse milkers than those of Devon, but then they will grow fat where a Devon would starve. The beef is sometimes objected to from the largeness of the bone and the coarseness of some of the inferior pieces, but the best sorts are generally excellent.

V. The Herefords in America.

Since there has been so much controversy—sometimes acrimonious—between some Hereford and Short-Horn breeders in the United States, and especially in the West, where the Herefords have of late grown into the highest favor, we again quote, from Mr. L. F. Allen, the veteran breeder of Short-Horns, and editor of the *American Short-Horn Herd Book*. Mr. Allen writes of the Herefords as follows:

“At what date they were first imported into this country, we have no accurate account ; but that some Herefords came out among the early importations, is evident from the occasional marks of the breed among our native cattle where late importations have not been known. In the year 1816 or '17 the great Kentucky statesman, Henry Clay, imported two pairs of them into his State, and put them on his farm at Ashland. They were bred for a time with each other, and the bulls were crossed with other cows ; but it is certain that they left no permanent impress on the herds of that vicinity, as Mr. Clay himself became a breeder of Short-Horns soon afterwards, and eventually discarded the blood from his herds, if he had for any length of time retained it. No trace of them is now seen in Kentucky.

VI. The Importation of 1840.

“The largest importation of Herefords into the United States, was made about the year 1840, upwards of twenty in number, by an Englishman into the city of New York, and taken into Jefferson county, of that State. A year or two afterwards the bulk of the herd were removed to the farm Mr. Erastus Corning, near Albany, N. Y., and some of them went into Vermont, where they were for some years bred, sold and scattered. While the stock were at his farm, Mr. Corning, with his accustomed liberality and enterprise, sent out again to England to purchase more animals, which safely arrived, and were added to the herd. They were then successfully bred for several years, many sales made into different and distant parts of the United States, and they acquired considerable popularity. The herd was subsequently divided, Mr. Corning retaining his share, and his partner taking his, some twenty or more in number, to a farm three or four miles from Buffalo, on the banks of the Niagara. Here they were bred, and several sales made, to go to different parts of the country, during the four or five years they remained ; but the herd gradually waned, mainly from want of proper care and system in their keeping.

“Mr. Corning retained his herd at his farm, where he has successfully bred, and made sales from them since, and in the hands of his son, Mr. E. Corning, Jr., who is more an amateur than a professed cattle breeder, added to by occasional importations from England, they remain fine specimens of their race.

VII. Hereford Grades Fifty Years Ago.

“Mr. George Clark, at Springfield, Otsego county, N. Y., obtained several Herefords from this herd, and, we believe, made an importation or two from England. He bred them successfully, distributed his bulls

on to several of his farms, and bred many excellent grade Herefords from the common cows. His bullocks have, in past years, been highly approved in the New York cattle markets.

VIII. The Ohio Importation.

“About the year 1852–3, Messrs. Thomas Aston, and John Humphries, two English farmers in Elyria, Ohio, near Lake Erie, imported several fine Herefords. They bred them well and successfully, as seen in the specimens we have several times met, but with what success in their sales we have no intimate knowledge.

IX. Herefords in Canada.

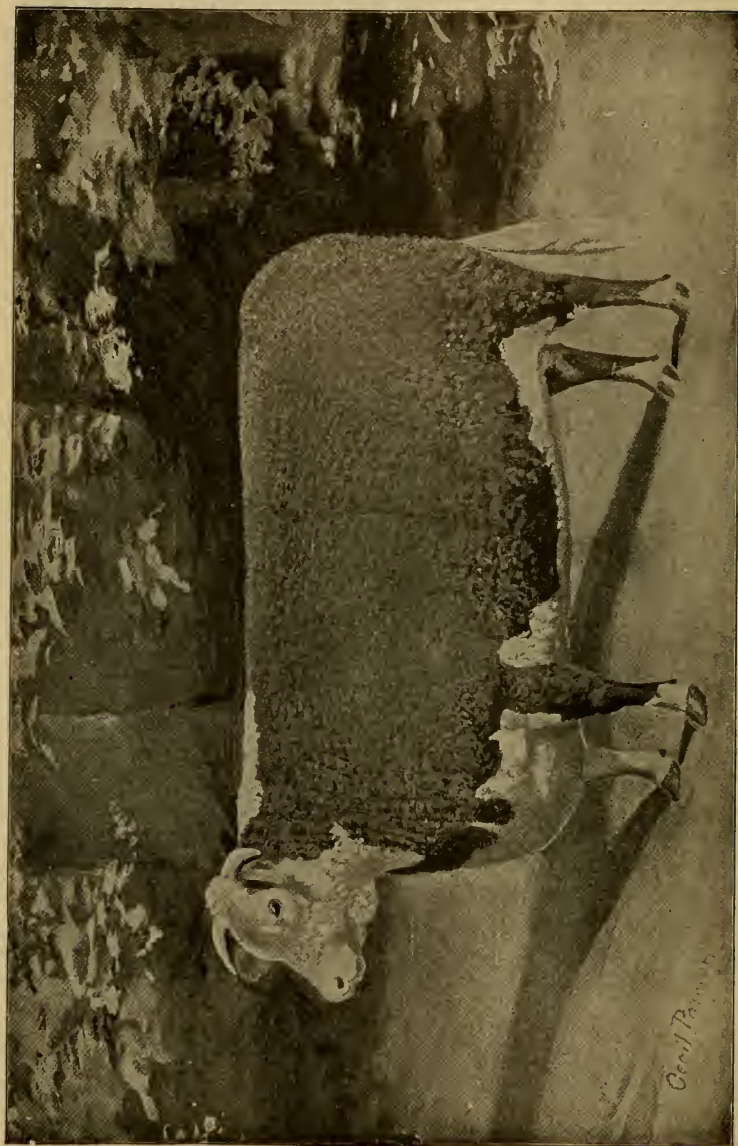
“In the years 1860 and '61, Mr. Frederick Wm. Stone, of Guelph, Canada West, made two importations of superior Herefords from the herds of Lord Bateman, in Herefordshire, and the late Lord Berwick, in the adjoining county of Shropshire, England, numbering, together, two bulls and eleven cows and heifers. These were remarkable for their high breeding, and generally good points. From them down to January, 1867, there were bred about sixty, and about half the number have been sold at satisfactory prices, and distributed, mostly into the United States. Some of the cows have proved excellent milkers, and all, together with the crosses of the bulls with common cows, have proved profitable grazing animals.

X. Early Imported Herefords Not Fairly Tried.

“On the whole, the Herefords have not had a fair trial in the United States, in the hands of veteran cattle breeders who had the means and opportunity to properly test them by a thorough and persistent course of breeding. Had the fine herd which was for several years on Mr. Corning's farm, been taken to good grazing lands in New York, or some of the Western States, and properly cared for, their history, we fancy, would have been far different from that which is here recorded.”

XI. The Herefords West.

Since Mr. Allen wrote, the Herefords have been tried in many Western States, and in no respect either in kindly fattening, early maturity or heavy weights have they failed fairly to compete with the best Short-Horns in the principal prize fairs of the West, often carrying off the highest honors. Besides the breeders already mentioned, none have done more for the Herefords in the United States than Mr. Miller and Mr. Culbertson, of Illinois, each of whose large herds is composed of the very highest-caste animals to be found anywhere.



HEREFORD HEIFER, "BEAN REAL'S MAID."



GROUP YOUNG HEREFORDS.
Prize Winners in National Show.—Specially photographed for this work.

XII. The Hereford as a Work-Ox.

As work oxen the Herefords are inferior to the Devons, when activity is wanted, but for heavy draft they have no superior, being muscular, steady and patient at the yoke. Their capacity for standing fatigue, and their constitutional hardihood and resistance to cold are indeed remarkable, and of late years they have become great favorites with the ranchmen in the far Western States and Territories.

XIII. The Hereford Cow.

Two years ago, in collecting information about this valuable beef breed, we wrote, and now repeat:

The Hereford cow compared with the ox is small and delicate, and not always handsomely made, to the superficial observer.

Here again this breed would seem to show its relationship to the Devon. She carries but little flesh in breeding condition, and when breeding, should not be fed sufficiently to accumulate much fat, for, in order that the young be superior, the dam should have plenty of room inside.

With the Herefords, experience has shown that the dam may not be too large or coarse but she should be roomy. Then the breeder will get, even from apparently inferior cows, large, handsome steers, that will fatten early, and kindly, and to great weights.

When the cow is done breeding, and ready for fattening, it will please the owner to see how she will spread out, and accumulate flesh and fat, and this to a greater degree than if not allowed to breed.

The Herefords are a hardy, gentle race, maturing early, and are long-lived. The flesh is superior, handsomely marbled, heavy in the prime parts, and they fatten to weights fully as heavy as any known breed.

Their massive strength, honesty and gentleness make them the best working oxen known, and the potency of the bulls, when crossed upon red or nearly red cows of the country, renders the steers easily matched in color, as they will be easily matched in general characteristics of the progeny.

XIV. Points of the Hereford.

In judging the Herefords as beef animals the same scale of points may be adopted as for Short-Horns, except that the Herefords are, if anything, more placid, closer to the ground, heavier in appearance, better grazers, and thicker meated than many strains of Short-Horns.

XV. The Hereford of To-day in England.

It has been claimed, and we think with truth, that in some show rings in the West the Herefords were discriminated against. Be this as it may,

in England there is no such feeling against them, and, besides, the English system of judging precludes, to as great an extent as possible, any shadow of favoritism.

Speaking of one of the great show rings there in 1878, the Bath and West of England, the *Mark Lane Express* says of the Hereford exhibit :

“They are not so numerous as the more fashionable breed, but the quality throughout is excellent. In the aged bull class there are five animals of which the Hereford men need not be ashamed.

“The heifers in milk or in calf numbered only three, but two of them were such animals as it was worth while coming to Oxford on purpose to see. Leonora (first premium) is one of the most perfect animals that has been shown for years. It was first last year as a yearling at Liverpool, and will likely be first wherever it goes. The champion prize given by the Oxfordshire Agricultural Society was awarded to this heifer as the best female horned animal in the yard. The companion heifer, Beatrice, is also very handsome, and took second to Leonora’s first at the Royal last year, as it did last week at Oxford. If Leonora had been a Grand Duchess Short-Horn a poem would have been composed in her honor, and translated into several languages by this time. But no Short-Horn that we have ever seen was cast in such a mould.”

XVI. High and Authoritative Praise.

The following is high praise, and authoritative, as coming from an English agricultural paper of the highest class. The *Agricultural Journal*, of London, says :

“This breed enjoyed the remarkable distinction of producing both the champion animals at Oxford, Grateful being declared to be the best bull, and Beatrice (a two year old heifer) being declared to be the best cow or heifer in the yard. Both, as may be supposed, were very good, the heifer pre-eminently so. She is a daughter of the famous bull, Winter De Cote, and another instance of hereditary merit.

“The yearling heifers and calves indicate that this breed is, as beef makers at an early age, quite up to the highest Short-Horn standard. The Teeswater may milk better, and be more ready in adapting itself to local circumstances ; but where the pasture is good, it is hard to beat the white-faces for grazing.”

Again, the *Chamber of Agriculture Journal*, the organ of the Royal Agricultural Society, gives the following testimony :

“The old bull Hereford class produced an extraordinary animal in Grateful, who secured the reserve at the Hereford show in 1876. He has made wonderful development since appearing as a two-year old, as is proved by the fact that Thoughtful, who was then placed above him,

and has since taken firsts at Birmingham, Liverpool and Bath, has now been put second to him ; and that not only was he selected by the judges as the best Hereford bull on the ground, but in the contest for the championship succeeded in carrying it off against such a Short-Horn competitor as Sir Arthur Ingram. Grateful, at four years old, has capital loins and chines, with great thickness and depth of frame, and is very level all over ; but his grand feature is the astounding mass of flesh with which his frame is covered. His girth is eight feet ten and one-half inches.

“In the cow class, Lady Blanche, which took second prize at Bath, now came to the front position. She is marvelous at her fore flank, and displays a great mass of flesh on a well-shaped, grand frame, which, however, fell off slightly at the rump. The second prize cow, Little Beauty, was highly commended at Bath, and wonderfully retains her show-yard merit at eleven years old. The two-year old heifers, Leonora and Beatrice, were, of course, sure to win. Beatrice has recently reared a calf, which is slightly against her for showing ; but Leonora is in full bloom with her beautiful head, symmetrical form, and all that loveliness which is so taking to the eye. After being selected as the best Hereford female on the ground, she carried off the champion prize against a remarkably shapely Short-Horn heifer, and one of the best Devons that has appeared for years, so that both cups were awarded to Herefords.”



JERSEY BULL PEDRO'S PRETTY POGIS.

XVII. Distribution in the South-west and Far West.

Since neither pains nor money has been spared in bringing the best English animals to this country, there is no doubt but that the West to-day possesses Herefords, both bulls and cows, as good as there are in the world. Hereford bulls are being sent off and distributed in the far West, and South-west, where they are regarded with fully as much favor as the Short-Horns. Why should they not? There is plenty of territory left

CHAPTER VIII.

MIDDLE-HORNED CATTLE THE DEVON—THE SUSSEX—DUTCH BELTED CATTLE AND THE HOLSTEIN-FRIESIAN.

I. ANTIQUITY OF THE DEVONS.—II. THE DEVONS COMPARATIVELY SMALL CATTLE.—III. NATURAL GRAZING GROUNDS OF THE DEVONS.—IV. WORKING QUALITIES OF THE DEVONS.—V. THEIR DECEIVING APPEARANCE.—VI. POINTS OF THE DEVON.—VII. NOTABLE CHARACTERISTICS.—VIII. THE LEGS OF THE DEVON.—IX. THE BODY AND TAIL.—X. THE DEVON COW.—XI. MR. ALLEN'S TESTIMONY.—XII. THEY ARE ACTIVE AND HARDY.—XIII. IN THE FIRST CLASS FOR BEEF.—XIIIa. POLLED DURHAM CATTLE.—XIV. WEIGHTS OF THE DEVONS.—XV. SUSSEX CATTLE.—XVI. THE SUSSEX COLOR.—XVII. DISTINGUISHING MARKS OF THE SUSSEX.—XVIII. THE SUSSEX COW.—XIX. GLAMORGAN CATTLE.—XX. DUTCH BELTED CATTLE.—XXI. HOLSTEIN-FRIESIAN.—XXII. CHARACTERISTICS.—XXIII. MILK AND BUTTER RECORDS.—XXIV. TYPES.

I. Antiquity of the Devons.

In Chapter I, the general history of this ancient and superior race of cattle is given. They are the only breed of middle-horned cattle, except the Herefords, that has attained celebrity in the United States. In England, where they have been known from the earliest times, they have been bred pure. In certain sections, and especially in North Devon, particular pains was long ago taken in raising them. There the Devon unites all the characteristics of the tribe, including medium size, dark color, eminent working qualities and great excellence of beef. The peculiarities in color and substance about the eyes, nose and ears, have caused them to be known as North Devons, in contradistinction to the lighter-colored, larger and coarser cattle of other districts, but which combine some of the better qualities of the true Devon.

II. The Devons Comparatively Small Cattle.

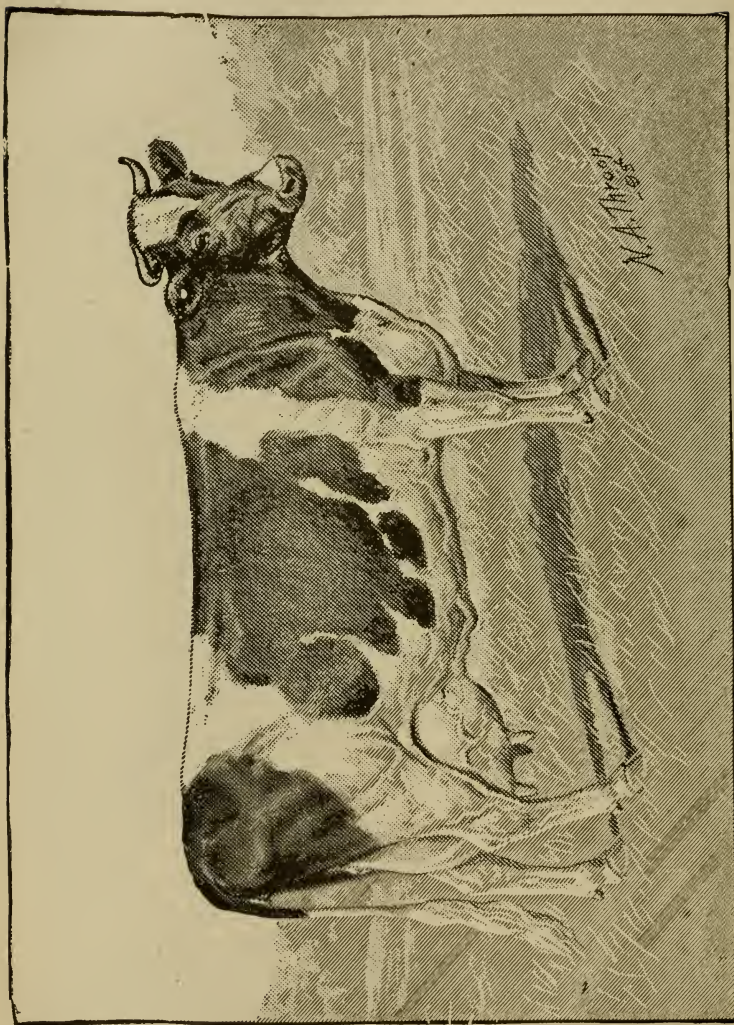
The chief objection to the Devons, in the West, is that they lack size to prove profitable on the flush and comparatively level pastures of the prairie region. They are, also, somewhat slow in maturing; in fact it used to be the practice in England to put the steers to work at three years old, and fatten them at five or six years old. Then, fully matured and spread, they wholly or partially paid for their keeping, and the quality of their flesh was only surpassed by that other slow-maturing, but wonderful cattle in the quality of their beef—the West Highland cattle of Scotland.

III. Natural Grazing Grounds of the Devons.

To-day in all our hill country, or where the labor of the steers can be utilized, they are the most valuable of any of the known breeds of cattle. In all the hill country, North and South, they will be found among the



DEVON HEIFER, "FASHION 5th."

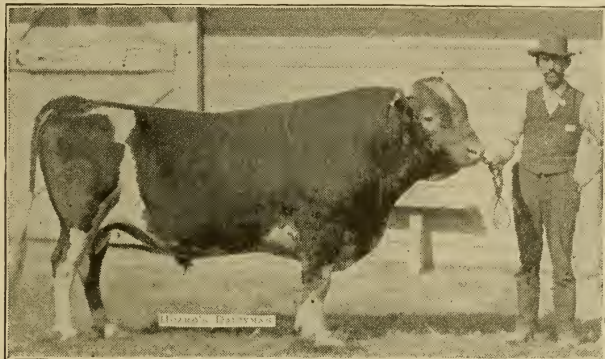


HOLSTEIN-FRIESIAN COW.

best, if not the very best, of domesticated cattle, when we consider the ease with which they are kept, their powers of withstanding extreme heat and cold, and their valuable working qualities; for they are able to perform fully as much work as the horse in plowing, especially in small fields where there is much turning.

IV. Working Qualities of the Devons.

We have known them to keep fully up with horses, day after day, in heavy plowing—a yoke of Devon steers at the beam, and a pair of horses ahead. So, in stubble plowing; a single yoke of Devon steers, week in and week out, would do fully as much work on small lands as a good pair of horses; and they turn the furrows quite as steadily as the horse team. The horses would gain something in going straight ahead, but in coming about the Devon steers always made it up. This was when the



GUERNSEY BULL DOLLY'S DUKE.

steers were fed grain the same as the horses. When both are kept on grass, the Devons will do more work than any pair of horses of the same weight.

In catching times, in hauling hay and grain to the stack, we have driven Devon steers at a six-mile trot in going back light; and their wonderful tractability, under kind but firm training, certainly makes them most admirable teams for new or thinly-settled districts. For logging in the woods, or hauling logs to the mill, there are no better or quicker teams, and it is surprising, under good keeping, the load they will start, and the power with which they will move it along the road.

V. Their Deceiving Appearance.

The Devons are essentially muscular cattle. They are far heavier than they look. This is owing to their fine bone—nearly as hard as that of a blood horse—their round, compact form, and the full flesh they carry.

The cows are small; and the bulls are smaller than the steers. When properly developed by two years of work, the oxen are splendidly filled out, and are certainly the most beautiful of all the domesticated ox tribe. The illustration we give will show the Devon ox in good working condition. The cut of a high-caste bull, illustrating especially the full, soft, mossy coat of hair, as given in Chapter I, is a most excellent and life-like drawing.

VI. Points of the Devon.

Youatt describes the points of the Devon of his day most minutely. Except that they have now, through better feeding in America, been increased in size and early maturity, the description is as applicable to-day as when it was written. It is as follows:

“The horn of the bull ought to be neither too low nor too high, tapering at the points, not too thick at the tip.

The eye should be clear, bright, and prominent, showing much of the white, and have around it a circle of dark orange color.

The forehead should be flat, indented, and small, for, by the smallness of the forehead, the purity of the breed is very much estimated.

The cheek should be small, and the muzzle fine; the nose must be of a clear yellow.

The nostril should be high and open; the hair curled about the head.

The neck should be thick, and that sometimes almost to a fault.

Excepting in the head and neck, the form of the bull does not materially differ from that of the ox, but he is considerably smaller. There are exceptions, however, to this rule.

The head of the ox is small, very singularly so, relatively to his bulk; yet it has a striking breadth of forehead; it is clean and free from flesh about the jaws.

The eye is very prominent, and the animal has a pleasing vivacity of countenance, distinguishing it from the heavy aspect of many other breeds.

Its neck is long and thin, admirably adapting it for the collar, or the more common and ruder yoke.

It is accounted one of the characteristics of good cattle, that the line of the neck, from the horns to the withers, should scarcely deviate from that of the back.

VII. Notable Characteristics.

“In the Devon ox, however, there is a peculiar rising at the shoulder, reminding us of the blood-horse, and essentially connected with the free and quick action by which this breed has ever been distinguished.

It has little or no dewlap depending from the throat.



PURE BRED DEVON CATTLE.
Many Times Prize Winners.—Specially photographed for this work.

The horns are longer than those of the bull, smaller, and fine even to the base, and of a lighter color, and tipped with yellow.

The animal is light in the withers; the shoulders a little oblique; the breast deep, and the bosom open and wide, particularly as contrasted with the fineness of the withers.

The fore legs are wide apart, looking like pillars that have to support a great weight.

The point of the shoulder is rarely or never seen. There is no projection of bone, but there is a kind of level line running on to the neck.

Angular bony projections are never found in a beast that carries much flesh and fat.

The fineness of the withers, the slanting direction of the shoulder, and the broad and open breast, imply strength, speed, and aptitude to fatten.

A narrow-chested animal can never be useful either for working or grazing.

With all the lightness of the Devon ox, there is a point about him, disliked in the blood or riding horse, and not approved in the horse of light draught—the legs are far under the chest, or rather the breast projects far and wide before the legs. We see the advantage of this in the beast of slow draught, who rarely breaks into a trot, except when he is goaded on in catching times, and the division of whose foot prevents him from stumbling.

The lightness of the other parts of his form, however, counterbalances heaviness there.

VIII. The Legs of the Devon.

The legs are straight, at least in the best herds. If they are in-kneed or crooked in the fore legs, it argues a deficiency in blood, and comparative incapacity for work, and for grazing, too; for they will be hollow behind the withers, a point for which nothing can compensate, because it takes away so much from the place where good flesh and fat should be thickly laid on, and diminishes the capacity of the chest and the power of creating arterial and nutritious blood.

The fore-arm is particularly large and powerful. It swells out suddenly above the knee, but is soon lost in the substance of the shoulder.

Below the knee the bone is small to a very extraordinary degree, indicating a seeming want of strength; but this impression immediately ceases, for the smallness is only in front—it is only in the bone; the leg is deep, and the sinews are far removed from the bone, promising both strength and speed.

It may be objected that the leg is a little too long. It would be so in an animal destined only to graze; but this is a working animal, and some length of leg is necessary to get him actively over the ground.

IX. The Body and Tail.

“There is some trifling fall behind the withers, but no hollowness, and the line of the back is straight from thence to the setting on of the tail. If there is any seeming fault in the breast, it is that the sides are a little too flat. It will appear, however, that this does not interfere with feeding, while a deep, although somewhat flat chest is best adapted for speed.

The two last ribs are particularly bold and prominent, leaving room for the stomach and other parts concerned in digestion to be fully developed.

The hips, or huckles, are high up, and on a level with the back, whether the beast is fat or lean.

The hind quarters, or the space from the hip to the point of the rump, are particularly long and well filled up—a point of importance both for grazing and working. It leaves room for flesh in the most valuable part, and indicates much power behind, equally connected with strength and speed. This is an improvement quite of modern date. The fullness here, and the swelling of the thigh below, are of much more consequence than the prominence of fat which is so much admired on the rump of many prize cattle.

The setting on of the tail is high, on a level with the back, rarely much elevated or depressed. This is another great point, as connected with the perfection of the hind quarters.

The tail is long and small, and taper, with a round bunch of hair at the bottom.”

X. The Devon Cow.

We have stated that the bulls are smaller than the oxen. All steers when mature, may be fattened to greater weights than the bulls, whatever the breed. In the Devons, the increased size of the steers is especially noticeable. The Devon cows are also naturally smaller than the bulls, but especially elegant in their compact, rounded forms, constancy and beauty of color, and are noted for docility of temper when kindly treated and for their active, ardent temperaments. They will resent abuse, for they have the courage of the blooded horse. There is no more beautiful picture than a herd of Devon cows in the pasture, for there is no animal more elegant in form. Yet small as the cows seem, put them on the scale, and the person not used to judge them will be surprised at their weight.

All Devons are noted for their round, full, clear eyes, the golden circle about the eyes, and the yellow skin of the inside of the ears, as well as for the orange or yellow-colored muzzle. The cow is particularly noticeable in these characteristics. Add to this their cheerful and intelligent

countenance; the clean jaws, throat and dewlap; the magnificent loin; the round barrel; the muscular hind quarter, quite free from angles of any kind; the long, tapering tail; and for elegance, fine flesh and great working powers, the Devons have no superiors among cattle.



THE NORMAN COW.

The claim is made for this breed, and especially those denominated "Cottentine," that they are the first milkers in the world. There are cows all over Normandy that will produce more than eight gallons of milk per day, and they have been known to produce over twelve gallons. Their average yield of milk per year is about 750 gallons. The milk is not rich in butter, as that of some other races, but its abundance more than compensates for the difference. The animals are very large and "raw-boned," frequently weighing over 4000 pounds. On account of the large bones, they are not so desirable for beef as some other breeds.

XI. Mr. Allen's Testimony.

Let us see what the venerable editor of the Short-Horn Herd-Book says of them as working oxen:

They are, among cattle, what the thoroughbred is among horses. According to their size, they combine more fineness of bone, more muscular

power, more intelligence, activity, and "bottom," than any other breed. They have the slanting shoulder of the horse, better fitted to receive the yoke, and carry it easier to themselves than any others, except the Herefords.

With all workers of oxen, the nearer the beast approaches in shape, appearance, and action to the Devon, the more valuable he is considered, according to weight. For ordinary farm labor, either at the plow, the wagon, or the cart, he is equal to all common duties, and on the road his speed and endurance are unrivalled. It is in these qualities that the New England oxen excel others of the country generally, and why the people of that section often call their red oxen "Devonshires," when they cannot, to a certainty, trace any, or but a small portion of that blood in them, only by a general appearance and somewhat like action.

XII. They are Active and Handy.

For active, handy, labor on the farm, or highway, under the careful hand of one who likes and properly tends him, the Devon is everything that is required of an ox, in docility, intelligence, and readiness, for any reasonable task demanded of him. Their uniformity in style, shape, and color, render them easily matched, and their activity in movement, particularly on rough and hilly grounds, gives them, for farm labor, almost equal value to the horse, with easier keep, cheaper food, and less care. The presence of a well conditioned yoke of Devon cattle in the market place at once attests their value, and twenty-five to fifty dollars, and even higher prices over others of the common stock, are freely given by the purchaser.

The Devon, in his lack of great size, is not so strong a draught ox as some of the other breeds—the Herefords, for instance—or perhaps some of the larger of the common cattle; but, "for his inches," no horned beast can outwork him. On light soils, and on hilly roads, none other equals him, although we intend to give all their due share of merit.

XIII. In The First Class for Beef

We must place the Devon in the first class, for fineness of flesh and delicacy of flavor. Its compact bone gives it the one, and its rapid and thorough development under good feeding gives it the other. In growth and size it matures almost equal to the Short-Horn, and its meat is finer grained, juicy, and nicely marbled, (the lean and fat intermixed.) In the London markets, Devon beef bears the highest price of any, except the Highland Scot—usually a penny a pound over that of larger breeds, and our American butchers quickly pick the Devons from a drove, when they can find them, before most others. They feed well, take on flesh rapidly, and in the quality of their flesh are all that can be desired.

XIIIa. POLLED DURHAM CATTLE.

Among the several distinctive breeds of improved domesticated cattle, we know of but one originated in the United States, that has become celebrated, under the specific name of Polled Durhams—an offshoot of the famous Short Horn family. In this connection it is remarkable that two distinct origins should have occurred at about the same time, without either party knowing of the work of the other, until these "sports" had for some time been perpetuated.

One of these was in a herd of high grade Short Horns; the other in a herd of the highest bred pedigreed Short Horns in the United States. There is in these no taint even of the far away Collins Galloway Cross. The writer of this had been conversant with the offshoot of the Short Horns for some time previous to its appearance before the public, and assisted in organizing the Polled Durham Society and had the honor of suggesting the specific name adopted by the Society, November 14th, 1889.

The Polled Durhams were and are not only specifically like Short Horns in color and characteristics generally, but besides being eminent in flesh, are also deep milkers, and eligible to entrance in the American Short Horn Herd Book.

The stock holders and breeders of this Polled family of the Short Horn race now comprise nearly three hundred—in sixteen States, principally in the Middle-West and South—the home of the great breeding grounds of all the superior breeds of domestic cattle of the world.

The breeders of Polled Durhams have had to contend with misrepresentation, of course, relating to this now well fixed breed of hornless cattle. The American Short Horn Herd Book welcomed the purely bred to its herd book, and the eminent breeders of the other classes of pedigreed cattle welcomed them. But the farming world, of England, alone, sought to cast reproach in the following words, as collated from the "Prairie Farmer" soon after the organization of the Polled Durham Society.

"Our enterprising cousins on the other side of the Atlantic are ever hunting after improvements. There is no limit to their inventive genius. Not satisfied with the pure breeds of cattle which we send them from this country, they have now resolved to found a breed of their own. By mating Aberdeen-Angus sires with Short Horn cows, they have succeeded in forming a class of cross (bred?) without horns, but in regard to color and other cattle characteristics strongly resembling the Short Horns."

So much for this tirade which fell still born.

During the life of the great Dr. Johnson, soon after he had compiled his dictionary, he received a visit from the then Duke of Argyle, surnamed the Great. The Doctor had the habit of keeping notable people waiting before he received them. The Duke amused himself while waiting in looking over the then new dictionary. The Doctor saluted him and observed, "Oh, my lord, I see you have my dictionary. How do you like it?"

The Duke replied, sarcastically, "They are braw stories but unko short. By the way, Doctor, I see here the word Aits (Scotch for oats) food for horses in England and men in Scotland, and where, mon, will you find such horses and such men?" The Polled Durham breeders can aptly reply to cavillers, "Where will you find such a combination of milk and beef as in the Polled Durhams?"



SUSSEX STEER, "YOUNG DAISY."

XIV. Weights of the Devons.

While the Devons are called small cattle, they are only relatively so in comparison with Short-Horns and Herefords. A full-grown ox in good condition will weigh from 1,400 to 1,600 pounds, and when well-fattened they will reach 2,000 pounds. The cows will weigh from 800 to 1,100 pounds, and the bulls 1,200 to 1,400. We bred one that at 8 years old weighed 1,819 pounds, and he was as extraordinary in his fineness and style, as a premium taker, as he was in weight; not large to look at, but weighing like a lump of lead.

XV. Sussex Cattle.

Sussex also has long been noted for a breed of middle-horned cattle—all red, but lighter in color than the Devons, larger and in every way coarser. Still they are better milkers than the Devons and fatten kindly. There are a number of breeds allied to the Devons or descended from them in England. The Sussex is one of these breeds.

XVI. The Sussex Color.

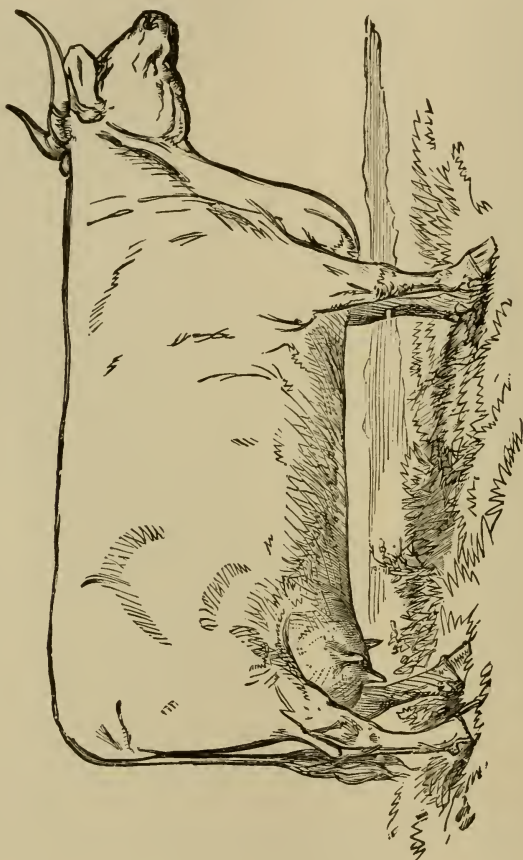
The color is a light chestnut or blood bay, much lighter than the true North Devon, but fully as uniform. The cut of a Sussex cow will, with the description given below, serve to explain the points of difference. They are mentioned here mainly, if not solely, for the reason that they have been sold as Devons. If you buy Devons, or any other highly-bred stock, be sure there is no stain in the pedigree. It is a matter of the utmost importance to the breeder of high-caste cattle.

XVII. Distinguishing Marks of the Sussex.

On this subject Youatt says: "The horns are more tapering, pushing farther forward, and turning up more. The head is small and well formed, the eye full, large and mild in the ox, but rather wild and unquiet in the cow. The throat is clean and the neck long and thin, but coarser than in the Devon. The shoulder is wider and rounder on the withers; straighter from the top of the withers towards the back, and carries much flesh, giving too much weight to unprofitable parts. On the other hand, the barrel is round and deep, the back straight, and the back-bone entirely hidden by the muscles on each side. The heart and lungs are full and large, and the belly and flank capacious. The barrel is well-ribbed home. The loins are wide, the hip-bone low, free from raggedness, large, and well spread, and the space between the hips well filled up. The tail, which is fine and thin, is set on lower than in the Devon, yet the rump is nearly as straight, for the deficiency is supplied by a mass of flesh and fat swelling above. The hind quarters are cleanly made, and if the thighs appear to be straight without, there is plenty of fullness within.

XVIII. The Sussex Cow.

“The cows have fine hair, a mellow, rather than thin skin; a small teat; horns fine, clean, and transparent, which reach forward from the head and turn up at the tips; the neck is thin and clean; back and belly



CUTLINE OF A SUSSEX COW.

straight; ribs round and springing out well; shoulder flat, but projecting at the point.

Hips and rump wide; the tail set on level with the rump, and the carcass large; the legs are rather short and fine.

The cows are not good milkers; they are often uneasy in the pasture, and often unquiet in temper."

They have been exhibited and sold as Devons in the United States, a thing which, of course, none but the most unprincipled of men would at-



BLACK POLLED ANGUS BULL.
Photographed for this work.

tempt. Give them a wide berth. They have little or no value in this country among better cattle.

XIX. Glamorgan Cattle.

The cattle of Glamorgan, Wales, are noted for good messes of milk, for docility, ability to forage for themselves on their native hills, and for

taking on flesh kindly when dry. They are undoubtedly of Devon origin and belong to the Middle-Horns. They are an ancient race, and have been preserved pure in their native region, but are little known away



HIGH GRADE AYRSHIRE COW.
Specially photographed for this work.

from there. Occasional specimens have been imported to the United States, more as curiosities than for intrinsic value, either for milk or beef, when there are so many superior breeds in either direction. The illustration shows their characteristics perfectly.

XX. Dutch Belted Cattle.

The origin of this breed of cattle dates back nearly three centuries. They are natives of Holland where they are known as Lakenfeld Cattle—the name being descriptive, as “laken” means a blanket or sheet about the body. The characteristic color of this breed has been established by scientific breeding, the white belt being now always a characteristic which pertains to every true blood of that breed.

There is little written historical data concerning the breed, but it is known that their introduction into America dates back to 1838 when the first importation to New York was made by D. H. Haight of that state, and which was followed ten years later by a second large importation. We are advised that P. T. Barnum, the famous show man, who had a genius for advertising, imported a herd to gratify his ruling passion of doing unusual things, and that other importations were made by R. W. Coleman. They became well known and popular in southern New York and ultimately found their way into New Jersey, Pennsylvania, New Hampshire, Indiana, Illinois, and south to a considerable extent, especially in South Carolina and Mississippi. There are a few herds in the Pacific coast states. They are smaller in size than the Holstein-Friesian, which corresponds in weight more nearly to the Ayrshire. The cows weigh from 900 to 1,250 pounds, while the bulls sometimes reach the weight of 2,000 pounds. Some of the more noted animals have reached 1,200 pounds at three years and a weight of 1,500 pounds of the bull should prevail. A number of prize winning milch cows of this breed have weighed from 1,150 to 1,300 pounds.

In color the cattle are invariably black, with a white band of varying width about the body in front of the hips and behind the shoulders. This band has in instances narrowed to a foot in width and again it has been three feet wide, and has been transmitted from one generation to another in that width for the full grown animal. The udder of the cow in its fore part is often white. In udder formation and development these cows are rather inferior, the size being comparatively small, the fore udder being somewhat abbreviated and the tits too close together.

Aside from being ornamental the principal value of this breed is its dairy importance. The actual monetary importance of the breed aside from its beauty does not really justify high praise. The record of one premium winner, Lady Aldine, 124, is that of a production of 32 quarts of milk a day on grass alone. Another similar record is that of Lady Baird, 82. The best test record made by the breed was that at the Pan-American Model Dairy in 1901 in which ten breeds participated. In this trial the five Dutch Belted cows made the following record in 120 days:

Yield of milk.....	24,893.5 lbs.....	Breed rank eighth
Churned butter.....	977.1 lbs.....	Breed rank tenth
Net profit on butter.....	\$111.96.....	Breed rank tenth
Total solids.....	3,066.47 lbs.....	Breed rank ninth
Value solids.....	\$275.98.....	Breed rank ninth

This is in no sense an extraordinary record.

As beef producers the Dutch Belted cannot be regarded as superior to the dairy breeds and will not compare with the Holstein-Friesian favorably. They do not produce flesh so characteristic of some Holstein-Friesian and they lack the size of the latter. There are few steers on the market of this breed because of the general scarcity of the breed.

The fertile meadows of the Mississippi Valley will provide more favorable conditions for the best development of the breed and the general adaptability of the Dutch Belted is quite comparable with the Dutch type if bred to thrive on abundant food under favorable conditions. A well known herd in America is in New Hampshire where it thrives in a rough, mountainous section where the winters are severe and long.

One of the special characteristics is the tendency to transmit the white belt even when crossed with other breeds. Crossed on cattle of any solid color they almost invariably produce the belt. If the dam be a Devon, however, the calf may be red at the ends instead of black. If the dam is a Short-horn the calf will sometimes be either red or roan. The belt, however, will be there and of pure white.

An interesting example of this intensity of Dutch Belted prepotency is that of a herd of the Ohio State University. A cow of this breed was bred to a pure Jersey bull and dropped a cross bred calf with a white blanket about the body similar to that of the dam but had in addition one small black spot on the white covering. The inferior value practically to this breed as compared with others is responsible for the fact that their distribution is still confined in the main to Holland, the United States, Canada and Mexico, and in the United States they are confined to New York, New Hampshire, Massachusetts, Pennsylvania, Ohio, Mississippi and California.

XXI. Holstein-Friesians.

Origin and Development.—The strongly marked black-and-white cattle of North Holland and Friesland constitute one of the very oldest and most notable of the dairy breeds. The historians of this race claim that it can be traced back for two thousand years, continuously occupying the territory named and always famous for dairy purposes. Tradition has it that two ancient tribes located upon the shores of the North Sea before the beginning of the Christian era; one possessed a race of cattle pure white and the other a kind all black. Men and cattle then became amalgamated, forming the people and herds which for centuries have occupied that

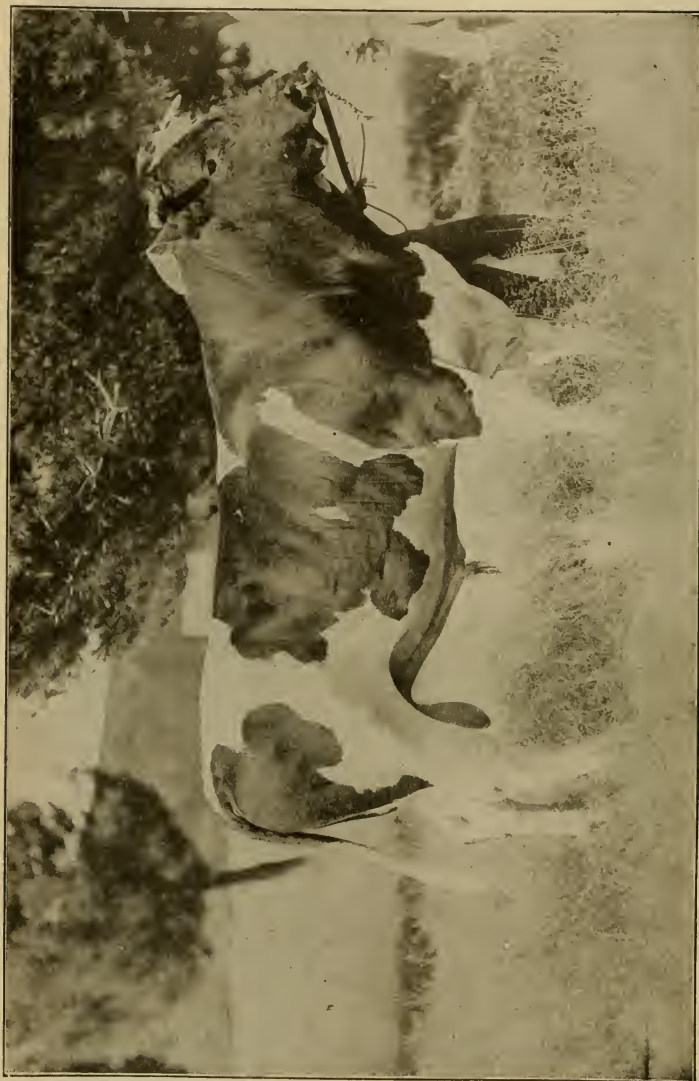


LADY STIRLING 3RD—No. 6230.



SILVER PRINCE—No. 7939.

The handsome head of the Dentonia Ayrshire Herd and a well-known prize-winner.



BEST IMPORTED FRIESLAND BULL, "PAUL," III.
First Prize at Bloemfontein Show, Also Gold Medal for Best Bull in Yard.
The property of I. M. Gradwell, Esq., Arcadia, Ladybrand.—Specially photographed for this work.

region. Holland has been noted for dairy products for at least a thousand years, and the great bicolored beasts upon which this reputation has been gained have been slowly but surely developing their present form of dairy excellence.

These cattle have been known by several different names in both Europe and America. "Holland cattle," "North Hollanders," "Dutch cattle," "Holsteins," "Dutch-Friesians," "Netherland cattle," and "Holstein-Friesians" are all the same. There was sharp contention in this country before the last name was agreed upon and generally accepted. It seems unfortunate that the simpler and sufficiently descriptive and accurate name of "Dutch cattle" was not adopted.

The large frame, strong bone, abundance of flesh, silken coat, extreme docility, and enormous milk yield of the Holstein-Friesians result from the rich and luxuriant herbage of the very fertile and moist reclaimed lands upon which the breed has been perfected, the uncommonly good care received from their owners and the close association of people and cattle. The Roman dominion brought improvements in draining and diking, in methods of cultivation and of cattle breeding, but no mixture of blood occurred with the inhabitants or in their herds. The preservation of the Friesian people and their continued adhesion to cattle breeding for more than two thousand years is one of the marvels of history. Always few in number, the conflicts of war and commerce have raged over and around them, yet they have remained in or near their original home, continuously following their original pursuits. Their farmhouses are fashioned after the same general model; the one immense roof covers everything that requires protection. Here the cattle find shelter during the long and rigorous winter months. Here they are fed and groomed and watched for months without being turned from the door. Here the family is also sheltered, sometimes with only a single partition between the cattle stalls and the kitchen and living room. Everything is kept with a degree of neatness marvelous to those not accustomed to such system. The cattle become the pets of the household. At the opening of spring or when grass is sufficiently grown they are taken to the fields and cared for in the most quiet manner. Canvas covers protect their bodies from sun and storm and insects. The grasses upon which they feed are rich and luxurious, and the animals have to move about very little to gather sufficient food. On the first appearance of winter they are returned to the stable and the simple round of the year is completed. This round is repeated until the cattle are 6 or 7 years of age, when they are usually considered as past the period of dairy profit and are sent to the shambles. The object is always to produce as much milk and beef as possible from the same animal. With this twofold object in view, selection, breeding, and feeding have been continued for ages."

This condensed description of the origin, development, and home treatment of this breed of cattle goes far toward explaining the characteristics of the breed as seen in this country.

The early Dutch settlers in America undoubtedly brought their favorite cattle with them during the seventeenth century, and there are definite records of three or four importations prior to 1850; but the credit of first introducing this breed to America and maintaining its purity here is due to Winthrop W. Chenery, of Massachusetts. He made three importations between 1857 and 1862. The Messrs. Gerrit S. and Dudley Miller, of New York, followed in 1867, and soon thereafter numerous others brought animals of this breed in considerable numbers to the United States. They have increased rapidly by importations and by breeding, and are now to be found in nearly all parts of this country.

XXII. Characteristics.

The striking features in the appearance of this breed are the color markings of black and white and the large size of the animals of both sexes. The shining jet black contrasts vividly with the pure white, the fine, silky hair being upon a soft and mellow skin of medium thickness. In some animals the black predominates, and the white in others. Black has been rather preferred among American breeders, to the almost entire exclusion of white in some cases, yet a few very noted animals have been mainly white. The average animal carries rather more black than white, and the distribution and outlines of the markings are extremely irregular. The black and white are never mixed, the lines of demarcation being usually sharply drawn. In Europe there are still some red cattle in this breed, and occasionally a purely bred calf is dropped in this country with bright red instead of black, showing the influence of some remote ancestor; but none are admitted to the American Herd Book except those black and white. In size the Holsteins are the largest of all the dairy breeds. The big, bony frames are usually well filled out, and the chest, abdomen, and pelvic region are fully developed. It is difficult to prevent the males from becoming too fleshy for breeding animals, and the females, when not in milk, take on flesh rapidly and soon become full in form. The cows range in weight from 1,000 to 1,500 pounds, most of them being between 1,100 and 1,400 with an average of about 1,250 pounds. The bulls at maturity are very large and heavy, often above 2,500 pounds in weight. The head is long, rather narrow and bony, with bright yet quiet eyes and large mouth and nostrils. The horns are small and fine, often incurving, and frequently white with black tips. The ears are large, thin, and quick in movement. The neck is long, slender, and tapered in the cows, its upper line often quite concave. The back line is usually level, particularly with the males, and the hips broad and prominent; some have well-rounded



AYRSHIRES.

Many Times Prize Winners.—Specially photographed for this work.

buttocks, but a drooping rump is not uncommon. The legs appear small for the weight carried and are quite long; the tail is long and fine and a white brush is required. The udder is often of extraordinary size, filling the space between legs set well apart, extending high behind and fairly well forward, with teats of large size and well placed. Teats are sometimes cone-shaped and uncomfortably large and puffy where attached to the udder. The milk veins are usually prominent and sometimes remarkably developed. There is a more marked inclination toward the beef form among the bulls than among the cows; the latter are generally of the true dairy type.

XXIII. Milk and Butter Records.

These great black-and-white cows yield milk in proportion to their size. The breed is famous for enormous milk producers. Records are abundant of cows giving an average above their own live weight in milk monthly for ten or twelve consecutive months, and there are numerous authentic instances of daily yields of 100 pounds or more for several days in succession and 20,000 to 30,000 pounds of milk in one year. Cows giving 40 to 60 pounds (or 5 to 7 gallons) per day are regarded as average animals; 7,500 to 8,000 pounds per year is depended upon as a herd average. A known record of 11 cows from 3 to 8 years old is 11,286 pounds (or 5,250 quarts per cow), the average milking period being three hundred and forty-one days. Another herd of 12 cows averaged 8,805 pounds a year (or 4,064 quarts) for four years. The milk of these very large producers is generally pretty thin, low in percentage of total solids, and deficient in fat. The cows have been favorites for dairymen doing a milk-supply business, but in numerous cases their product has been below the standards fixed by State and municipal laws. On the other hand, there are some families of Holsteins, and single animals are numerous, which give milk of more than average richness and show themselves to be profitable butter producers. Cows have frequently made from 15 to 25 pounds of butter a week, and 30 pounds in a few cases. Entire herds of good size have averaged over 17 pounds a week; a few cows have records of 90 pounds, and one almost 100 pounds, in a month. One of the herds already referred to averaged 308 pounds of butter per cow annually for four years, and there are several yearly herd records of over 400 pounds per head; also single records of 500 and 600 pounds, and one is claimed of 1,153 pounds of butter in three hundred and sixty-five consecutive days. A cow bred and raised in Texas made a remarkable record there, when five years old and weighing 1,350 pounds; she gave 707½ pounds of milk in seven days, which produced 22 pounds of butter, and in one month 2,958 pounds of milk containing fat equivalent to 86 pounds of butter. Holstein milk is characterized by fat globules of small and uniform size, separating slowly by the gravity method of creaming, and carrying very little color.

XXIV. Types.

It happens that both the selections for illustrating this breed represent imported animals, and consequently comparatively little can be told about them and their immediate ancestors. It would be easy, however, to find many equally good types among American-bred Holsteins. Indeed, it is believed that in respect to size and dairy quality the best animals of this breed in the United States are superior to those of their native country. De Brave Hendrik 230, H.-F. H. B., was dropped in North Holland in March, 1880, and during the years 1882, 1883, and 1884 won high prizes at Alkmaar, Gouda, and (first) at the great International Exhibition at Amsterdam. In March, 1883, he was designated by an official committee as the best bull in north Holland. He was imported in 1884 and owned in Pennsylvania. The likeness shows him as 4 years old, and he then weighed 2,300 pounds. This bull came from a great milking family, and the females sired by him proved uniformly excellent as dairy animals.

Jamaica 1336, H. H. B., was dropped in Friesland in 1880, and imported the same year to Orange County, N. Y. She had her first calf in December, 1882, and during a milking period of three hundred days gave 7,450 pounds of milk. Her second calf was dropped in December, 1883, and when one month in milk she had exceeded all known records for her age, and this upon the ordinary ration for milkers in the herd. Her feed was then carefully increased until she gave 73 pounds of milk a day, in January (1884), and a total amount of 2,026 pounds during that month. The milk yield continued to increase during February, notwithstanding unusually cold, rough weather, until she reached the maximum of 112 pounds 2 ounces of milk on the 2d of March, when she was 4 years old. She gave 535 pounds of milk in five days, 1,034 pounds in ten days, 2,102 pounds in twenty-one days, and almost attained an average of 100 pounds a day for a month. In four months Jamaica gave almost 10,000 pounds of milk, and about 20,000 pounds during this her second milking period. From her milk for a week 23½ pounds of butter were made. The average of grain fed to the cow during her greatest yield was 28 pounds, costing 30 cents, with an abundance of cut beets and good hay, and she had access to spring water in the stable yard five or six times a day. She received no silage, slops, stimulating food, or drugs. Jamaica was of medium size for her race, handsomely marked, vigorous, and very stylish, as shown by her likeness. This was made about the time of her famous test; she then weighed 1192 pounds. Her owner was offered \$15,000 for this cow and her heifer calf, shown in the picture, before her milk yield reached 100 pounds a day. After her great performance this offer was increased to \$25,000, and \$10,000 was refused for the calf alone.

CHAPTER IX.

POLLED CATTLE.

I. POLLED CATTLE IN GENERAL.—II. THE GALLOWAYS.—III. POINTS OF THE GALLOWAY.—IV. THE LIMBS AND HEAD.—V. THE SKIN.—VI. THE COLOR.—VII. THE GALLOWAYS IN AMERICA.—VIII. POLLED ANGUS CATTLE.—IX. COLOR OF THE POLLED ANGUS.—X. ANGUS COWS AS MILKERS.—XI. THE ANGUS COMPARED WITH THE GALLOWAY.

I. Polled Cattle in General.

Of the various breeds of polled or hornless cattle, however good in England, none have proved valuable in the United States and Canada, except the Galloways and the Polled Angus. Of these only the Galloways have been at all widely disseminated. Docility of temper even among old bulls; the little space taken up in the feeding stalls, on account of their mild disposition and absence of horns; their hardiness; the ease with which they take on flesh, and the thickness and fine quality of the beef are some of the principal characteristics of excellence in polled cattle.

II. The Galloways.

For the colder and hilly districts, when all cattle must be protected in winter, and in all regions where the Short-Horn proves too tender, the Galloway cattle are steadily gaining in favor. They are essentially beef cattle, it being unusual for the cows, even under good keeping, to give more than twelve quarts of milk a day, and the average is given at six or eight quarts. But the milk is rich, yielding a pound of butter, according to English authorities, to eight or ten quarts of milk. The cows, as a rule, go dry for two or three months in the year, even under the best of management.

It has been said of them that there is, perhaps, no breed of cattle which can be more truly said to be indigenous to the country, and incapable of improvement by any foreign cross, than the Galloways. The Short-Horns almost everywhere else have improved the cattle of the districts to which they have traveled; at least in the first cross produced manifest improvement; but even in the first cross, the Short-Horns have done little good in Galloway, and, as a permanent mixture, the choicest short-horn bulls have manifestly failed. The intelligent Galloway breeder is now perfectly satisfied that his stock can only be improved by adherence to the pure breed, and by care in the selection.

III. Points of the Galloway.

Mr. L. B. Allen gives, on the authority of an eminent judge and breeder, the characteristics of this breed, as follows :

The Galloway cattle are straight and broad in the back, and nearly level from the head to the rump. They are round in the ribs, and also between the shoulders and the ribs, and the ribs and the loins. They are broad in the loin, without any large projecting hook bones. In roundness of barrel, and fullness of ribs, they will compare with any breed, and also in the proportion which the loins bear to the hook bones, or protuberances of the ribs. When viewed from above, the whole body appears beautifully rounded, like the longitudinal section of a roller. They are long in the quarters and ribs, and deep in the chest, but not broad in the twist. The slightest inspection will show that there is less space between the hook or hip bones and the ribs than in most other breeds, a consideration of much importance, for the advantage of length of carcass consists in the animal being well ribbed home, or as little as possible lost in the flank.

IV. The Limbs and the Head.

The Galloway is short in the leg, and moderately fine in the shank bones,—the happy medium seems to be preserved in the leg, which secures hardihood and a disposition to fatten. With the same cleanness and shortness of shank, there is no breed so large and muscular above the knee, while there is more room for the deep, broad and capacious chest. He is clean, not fine and slender, but well proportioned in the neck and chaps ; a thin and delicate neck would not correspond with the broad shoulders, deep chest, and close, compact form of the breed. The neck of the Galloway bull is thick, almost to a fault. The head is rather heavy ; the eyes are not prominent, and the ears are large, rough, and full of long hairs on the inside.

V. The Skin.

The Galloway is covered with a loose, mellow skin of medium thickness, which is clothed with long, soft, silky hair. The skin is thinner than that of the Leicestershire, but not so fine as the hide of the improved Durham breed, but it handles soft and kindly. Even on the moorland farms, where the cattle, during the greater part of the year, are fed on the scantiest fare, it is remarkable how little their hides indicate the privations they endure.

VI. The Color.

The prevailing and fashionable color is black—a few are of a dark brindle brown, and still fewer are speckled with white spots, and some



RED POLLED HEIFER AND BULL.
Specially photographed for this work.

of them are of a dun or drab color, perhaps acquired from a cross with the Suffolk breed of cattle. Dark colors are uniformly preferred, from the belief that they indicate hardness of constitution.

VII. The Galloways in America.

The Galloways are said to have been first introduced into Canada about the year 1850. Since that time they have steadily increased by breeding and subsequent importations, and of late years a good many have been bred in the Northwestern States, where they are greatly liked for their many good qualities, and now have a regular series of prizes offered for them at all our principal fairs. They are also attracting attention in the Southwest as a means of improving the Texan cattle. To our mind, they should prove valuable in reducing the horn, refining the bone, and thickening the body of the Southwestern cattle, and, especially, in breeding out the wildness and viciousness of the Texans.

VIII. Polled Angus Cattle.

This is a breed yet rare in America, though much thought of in Scotland. Finer in their make up than the Galloways, of which they are relatives, they have many admirable qualities to commend them in hilly districts. There have always been some polled cattle in Angus; the country people call them *humlies* or *doddled* cattle. Youatt says that their origin is so remote, that no account of their introduction into England can be obtained from the oldest farmers or breeders. The attention of some enterprising agriculturists appears to have been first directed to them about sixty years ago, and particularly on the eastern coast, and on the borders of Kincardineshire. Some of the first qualities which seem to have attracted the attention of these breeders were the peculiar quietness and docility of the doddies, the easiness with which they were managed, the few losses that were incurred from their injuring each other in their stalls, and the power of disposing of a greater number of them in the same space.

A few experiments upon them developed another valuable quality—their natural fitness for stall-feeding, and the rapidity with which they fattened. This brought them into repute.

They have much of the Galloway form, and by those unaccustomed to cattle would be often mistaken for the Galloways. A good judge, however, would perceive that they are larger, somewhat longer in the leg, thinner in the shoulder, and flatter in the side.

Climate and management have caused another difference between the Angus doddies and the Galloways. The Galloways have a moist climate; they have a more robust appearance, a much thicker skin, and a rougher

coat of hair than the Angus oxen. The Angus cattle are regularly kept in straw yards during six months of the year, receiving turnips with their fodder every day, and in summer are grazed on dry and warm pastures. By this treatment they look and feel more kindly than the Galloways.



ABERDEEN-ANGUS BULL—HE'S A STAR.



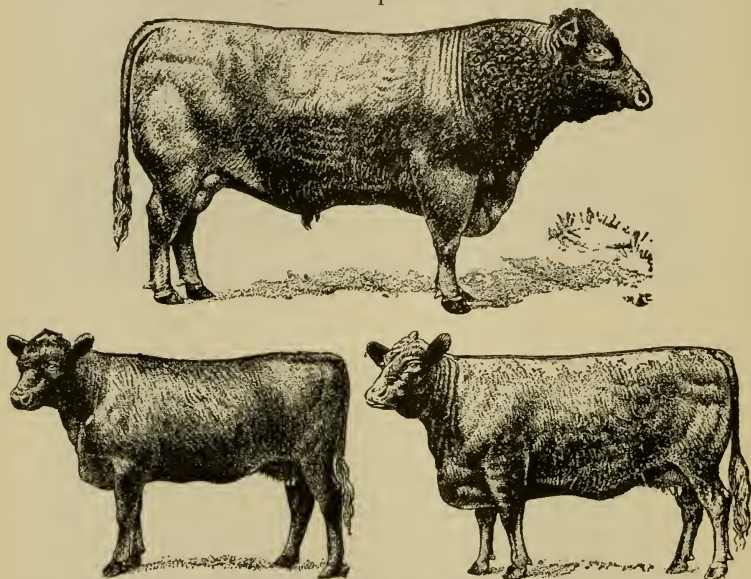
ABERDEEN-ANGUS HEIFER—ABBESS MCHENRY.

IX. Color of the Polled Angus.

The greater part of them are black, or with a few white spots. The next general color is yellow, comprehending the brindle, dark red, and silver-colored yellow. They are a valuable breed, and have rapidly gained ground on the horned cattle, and become far more numerous, particularly in the Lowlands; and when the agriculturist now speaks of the Angus breed, he refers to the polled species.

X. Angus Cows as Milkers.

The quantity of milk yielded by the dairy cows is various. In the hilly districts from two to three gallons are given per day, but that is very rich. In the lowlands the cows will give five gallons during the best of the season. The cows of this district were formerly regarded as some of the best dairy-cows in Scotland, but since the breed has been more improved, and greater attention paid to the fattening qualities, they have fallen off in their character for the pail.



ENGLISH GROUP OF RED POLLED CATTLE.

These cattle belong principally to the counties of Norfolk and Suffolk, in England. They are a very old race, and though quite small (seldom weighing over 720 pounds), the superior quality of their flesh, and their fattening freely at an early age, do away with all objections to their size.

XI. The Angus Compared with the Galloway.

Thus while Angus cattle have great value in their native climate, they would seem to possess no value in this country over the Galloway. When removed to a warmer latitude, in England, they degenerate, and the probability is, that in this country they will not prove so good as the Galloways, though it is probable that they will find admirers on account of the greater excellence of their flesh.

CHAPTER X.

DAIRY CATTLE—THE AYRSHIRES.

I. THE ANTIQUITY OF AYRSHIRE CATTLE.—II. AYRSHIRE ANCESTRY.—III. THE AYRSHIRE AS A MILKER.—IV. QUALITY OF THE MILK.—V. MR. YOUATT'S OPINION.—VI. QUALITY OF THE FLESH.—VII. THE AYRSHIRES IN AMERICA.—VIII. AYRSHIRE POINTS EIGHTY YEARS AGO.—IX. THE AYRSHIRE OF TO-DAY.—X. POINTS OF AYRSHIRE CATTLE.—XI. ESCUTCHEON OR MILK MIRROR.—XII. THE POINTS SUMMED UP.—XIII. THE BODY.—XIV. THE SKIN.—XV. MILK POINTS.—XVI. THE HEAD.—XVII. THE NECK, BODY AND LIMBS.—XVIII. IMPORTANCE OF GOOD TEATS.—XIX. COLOR, STYLE AND CONDITION.

I. The Antiquity of Ayrshire Cattle.

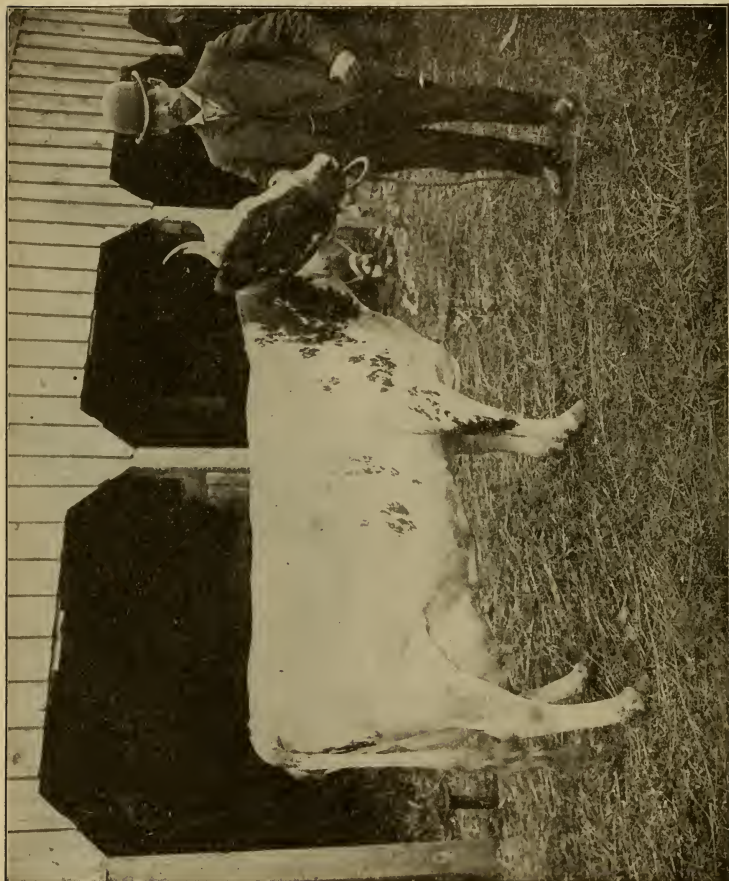
There are few climates better adapted to dairying than Ayrshire, in Scotland, and no other part of Great Britain has so long been noted for its superior milking cows. The climate is moist, with frequent soft rains and no severely cold weather in winter. The grasses therefore are naturally succulent and sweet.

The origin of the Ayrshire cow is in doubt. In 1733 it is recorded that no such breed existed in Scotland. Mr. Robertson, writing in 1703, credits the introduction of Ayrshire cattle into Scotland, on the authority of Mr. Bruce Campbell, to that Earl of Marchmont who succeeded his title in 1724, and died in 1740.

II. Ayrshire Ancestry.

In relation to their origin Mr. Robertson says: From what particular part of the country they came, there appears no evidence. My own conjecture is, that they are either of the Holderness breed, or derived from it; judging from the varied color, or from somewhat better evidence, the small head and slender neck, in which they bear a striking resemblance to them. These cattle, from which, by crosses with the native breed, the present improved Ayrshire arose, were first introduced on Lord Marchmont's estate in Berwickshire. A bull of the new stock was sold to Mr. Hamilton of Sundrum; then Mr. Dunlop, in Cunningham, imported some of the Dutch cattle, and their progeny was long afterwards distinguished by the name of the Dunlop cows. These were the first of the improved, or stranger breed, that reached the baillery of Cunningham. Mr. Orr, about the year 1767, brought to his estate of Grongar, near Kilmarnock, some fine milch cows of a larger size than any which had

been on the farm. It was not, however, until about 1780, that this improved breed might be said to be duly estimated, or generally established in that part of Ayrshire, although they had begun to extend beyond the Irvine, into Kyle.



MODEL AYRSHIRE COW

About 1790, according to Mr. Aiton, Mr. Fulton from Blith, carried them first into Carrick, and Mr. Wilson, of Kilpatrick, was the first who took them to the southern parts of that district. So late as 1804, they were introduced on the estate of **Penmore**, on the Stonchar, and they are

the established cattle of Ayrshire; they are increasing in the neighboring counties, and have found their way to most parts of Britain.

III. The Ayrshire as a Milker.

The quantity of milk yielded by the Ayrshire cow is, considering her size, very great. Five gallons daily, for two or three months after calving, may be considered as not more than an average quantity. Three gallons daily will be given for the next three months, and one gallon and a half during the succeeding four months. This would amount to more than 850 gallons; but, allowing for some unproductive cows, 600 gallons per year may be considered as the average quantity obtained annually from each cow.

IV. Quality of the Milk.

The quality of the milk is estimated by the quantity of butter or cheese that it will yield. Three gallons and a half of this milk will yield about a pound and a half *avoirdupois*, of butter. An Ayrshire cow may be reckoned to yield 257 English pounds of butter per annum, or about five pounds per week all the year round, besides the value of the buttermilk and her calf.

V. Mr. Youatt's Opinion.

Mr. Youatt, writing in the early part of the century says: They will feed kindly and profitably, and their meat will be good. They will fatten on farms and in districts where others could not, except supported by artificial food. They unite, perhaps, to a greater degree than any other breed, the supposed incompatible properties of yielding a great deal of milk and beef. It is, however, on the inferior soil and the moist climate of Ayrshire, and the west of Scotland, that their superiority as milkers is most remarkable. On their natural food of poor quality they give milk abundantly and long, and often until within a few days of calving; but when they are moved to richer pasture, their constitution changes, and they convert their food more into beef. It cannot be denied that even in this tendency to fatten when their milk begins to fail, or which often causes it to fail, the Ayrshires must yield to their forefathers, the Highlanders, and to their neighbors, the Galloways, when put on a poor soil; and they will be left considerably behind their Short-Horn sires when transplanted to luxuriant pasture. It will be long, perhaps, before they will be favorites with the butchers, for the fifth quarter will not usually weigh well in them.

VI. Quality of the Flesh.

Their fat is mingled with the flesh rather than separated in the form of tallow; yet this would give a more beautiful appearance to the meat, and

should enhance its price to the consumer. This fact of their flesh being so fully marbled with fat, would be an important consideration at the present time, if not when Mr. Youatt wrote, for tallow is not so valuable now as formerly, since the disuse of tallow candles, and this marbled flesh is much sought by butchers.

VII. The Ayrshires in America.

Mr. Allen, writing in 1867 in relation to their importation into America says: The Ayrshires first began to be imported into the United States about the year 1831. They were somewhat different in appearance from the latter importations, being in color usually deep red, or brown, flecked with white, of rather plain look, and having mostly black noses. In recent importations, or those within the last fifteen years, many of them have assumed more the Short-Horn colors, the red in them being of a lighter shade, and less of it—white being the prevailing color in many—and some of them a lively patched roan, with yellow noses, and handsome, and more symmetrical forms, but alike bearing the marks of good milkers.

VIII. Ayrshire Points Eighty Years Ago.

According to Mr. Aiton, the Ayrshire as it was found in its native country and in its improved form, in the beginning of the present century had these characteristics: Head small, but rather long and narrow at the muzzle; the eye small, but smart and lively; the horns small, clear, crooked, and their roots at a considerable distance from each other; neck long and slender, tapering toward the head, with no loose skin below; shoulders thin; fore-quarters light; hind-quarters large; back straight, broad behind, the joints rather loose and open; carcass deep, and pelvis capacious, and wide over the hips, with round fleshy buttocks; tail long, and small; legs small and short, with firm joints; udder capacious, broad and square, stretching forward, and neither fleshy, low hung, nor loose; the milk-veins large and prominent; teats short, all pointing outward, and at considerable distance from each other; skin thin and loose; hair soft and woolly. The head, bones, horns, and all parts of least value, small; and the general figure compact and well proportioned.

IX. The Ayrshire of To-Day.

The Ayrshire of to-day is noted for giving a large quantity of milk, rich in both butter and cheese; and also for the wonderful development of the thighs, the bulls being selected with reference to their feminine appearance. They are docile in temper, hardy, sound-constituted—the bulls broad in the hook bones and hips, and full in the flanks. Of late years there have been a number of herds introduced into the West, and



GROUP HIGH GRADE HOLSTEIN-FRIESIAN CATTLE—BUTTER-BRED STRAIN.
Specially photographed for this work.

wherever used they have been greatly liked. Careful selection has done much to keep down their fattening qualities on full feed, and it is probable that there is no strictly dairy cow that to-day combines so many good qualities as the Ayrshire cow.

X. Points of Ayrshire Cattle.

Dr. G. Lewis Sturtevant, of Massachusetts, a scientific investigator, and careful farmer, who has given particular attention to the characteristics and breeding of Ayrshire cattle in New England, minutely describes the points of Ayrshire cattle. With slight variations the same rules will apply to the Dutch or Holstein cattle to be hereafter noticed :

The usefulness of the dairy cow is in her udder, and toward the udder, its shape and its yield, all the capabilities of the cow should be directed. We may first view it as a reservoir for the milk. As such, it must be large and capacious, with broad foundations, extending well behind and well forward, with distinct attachments ; broad and square, viewed from behind, the sole level and broad, the lobes even-sized, and teats evenly distributed ; the whole udder firmly attached, with skin loose and elastic. Such a form gives great space for the secreted milk, and for the lodgment of the glands, while allowing the changes from an empty to a full vessel. The glands should be free from lumps of fat and muscle, well set up in the body when the cow is dry, and loosely covered with the soft and elastic skin, without trace of flabbiness. Such a covering allows for extension when the animal is in milk, while the glands are kept in proximity with the blood-vessels that supply them.

XI. Escutcheon or Milk Mirror.

I think a broad escutcheon is fully as good a sign as a long one ; the quantity or quality mean more than shape, yet I would not discard the shape entirely. The udder and its dependencies, the milk veins, and the escutcheon mark, may be considered the foundation of the Ayrshire cow. These influence profit, and also the shapes of the body and the form of the animal. The milk vessel is placed in the pubic region of the cow, and is protected on either side by the hind limbs. The breadth of its attachments secures breadth of body, and the weight requires also a depth of quarter and of flanks. The breadth below requires breadth of hip above, and length of loin here appears related to length of pelvis. So much for the physical portion. The physical function of milk-producing demands a great and continuous flow of blood, for it must not be forgotten that milk is blood, so to speak. This flow is dependent on the supply of food, and on the facilities of digestion. To gain this, a large body is required in order to hold the suitable digestive organs. To gain the most of our blood after it has absorbed the chyle from the digestive

organs, reason shows that it should find its way freely and speedily through the system on its labors of supply and removal, cleanse itself in the lungs, and again pass on to its duties. All this points to a healthy heart, not cramped, and lungs of sufficient capacity; for the yield of milk drains much nutriment from the system, and the constitution must needs have the vigor given by healthy and active heart and lungs. In this way the chest is correlated with the udder.

The reproductive functions require hook bones of good size, and a broad pelvis is desirable, as underlying within are the generative organs. Defects here are to be shunned.

XII. The Points Summed Up.

The points of the Ayrshire cow, as given by the Ayrshire Agricultural Society, and the New York State Agricultural Society, have been summed up as follows:

XIII. The Body.

The whole fore-quarters thin in front, and gradually increasing in depth and width backward, yet of sufficient breadth and roundness to insure constitution; back should be straight and the loins wide, the hips rather high and well spread; pelvis roomy, long, broad and straight, hook bones wide apart, quarters long, tolerably muscular, and full in their upper portion, but moulding into the thighs below, which should have a degree of flatness, thus affording more space for a full udder; the flanks well let down, but not heavy; ribs, behind, springing out very round and full, affording space for a large udder—the whole carcass thus acquiring increased volume toward its posterior portion.

XIV. The Skin.

In connection with the body and the udder, the skin is of great value in assisting our judgment. Between the portion of the external covering used for leather, and the muscle, there occurs a layer of cellular tissue, which contains a larger or smaller amount of fat cells, and the mellow handling caused by these cells indicates a free circulation throughout this meshwork.

The skin varies from a thin, papery hide, covered with silky hair, to a thick, supple, elastic hide, well coated with hair, on the one hand, and a similar variation, with harsh hair and coarseness, on the other. The thin, papery hide indicates quick fattening and a delicate constitution; thick, elastic hide, cushioned on fat, and which on the flank comes into the hand almost without grasping, indicates the height of vigor, accompanied by the fattening tendency, and the possessor of this handling endures climatic changes, low quality in his food, and neglect, with

remarkable hardihood, and quickly responds to full feed and good care. The harsh handler is a dull feeder, consumes much food, and generally contains more than a just proportion of offal or waste. In the Ayrshire cow we desire neither of these extremes, for it is in the milk product that we wish the feed to be utilized, and it is almost an unchanging law of nature, that deficiency in one direction must be compensated for by excess in another direction, and *vice versa*. At any rate, the cow that lays on fat too quickly is seldom a first class milker; and how well known is it that the cow of large yield milks down her condition. A cow that has a moderately thin, loose skin, of sufficient elasticity and suppleness of touch, without being fat-cushioned, as it were, with hair soft and mossy or woolly, if of correct form otherwise, will usually milk a large quantity, and when she becomes dry, will rapidly come into condition. In truth, the handling of the Ayrshire cow must be good; it cannot be too good; but it must not be of exactly that quality sought for in the grazing breeds.

There, as everywhere, the dairyman must keep to his line; milk, not fat, is his profit; and in seeking excess of both, he will be liable to fall below the average of either.

XV. Milk Points.

It is an axiom of breeders to diminish the useless parts of an animal as much as possible, or, in other words, to reduce the proportion of those parts not conducive to profit to as great extent as possible. Applying this rule to a dairy breed, we should desire a small neck, sharp shoulders, small brisket and small bone. Moreover, small bone usually accompanies thrift, and is universally found in improved breeds. We thus have a reason for these other Ayrshire points:

Shoulders lying snugly to the body, thin at their tops, small at their points, not long in the blade, nor loaded with muscle; brisket light; neck of medium length, clean in the throat, very light throughout, and tapering to the head; tail long and slender; legs short, bones fine, joints firm.

XVI. The Head.

The head should be small, in shape either long and narrow, or broad in the forehead and short, according to the type of animal preferred by the breeder, generally preferred somewhat dishing; the nose tapering to an expanded muzzle, with good clean nostrils. Opinions differ as to the general shape of the head. A broad forehead and short face occurs more frequently in bulls, and are generally esteemed a masculine characteristic; a more elongated face is called feminine. Yet some families of well-bred and good milking Ayrshire cows have the broad and short head, and such were, at one time, if not now, the favorites in the show-yard in Scotland.

The eye should be moderately full, lively yet placid looking. The eye is a mirror of the disposition, and interprets the character of the cow; a fretful, irritable animal is seldom a quick fattener, and usually disappoints at the pail. It also gives expression to the features, and physiognomy aids our judgment.

The ears should be of a good size, but thin, and their skin of rich yellow color. Coarse ears are usually found on ill-bred animals, and these may be considered, to a certain extent, indicative of general coarseness. The color of the skin, as shown inside the ear, is usually considered indicative of the richness of the milk in butter.

The horns should be of medium size, of fine texture, with an outward and upward turn, or inclining upwards and curving slightly inwards, according to the taste of the breeder. They should be set on rather widely apart. A coarse horn may indicate a coarse and thick hide, as there seems an intimate relation between the composition of the horn, hair, and hide, and the influence of climate on horn and hair gives an appearance oftentimes of correlation between the two.

XVII. The Neck, Body and Limbs.

The neck should be of medium length throughout, and tapering to the throat, which should be clean or free from loose, hanging skin. Yet too thin a neck is not desirable, as it usually indicates a delicate animal. A thick-set neck, well covered, yet not overladen with muscle, accompanies hardness and vigor of constitution.

The junction of the neck with the body and over the shoulders is called the crops; on a horse it would be called the withers. A hollow behind this point is a never-failing sign of weakness. The crops should blend in easily with a thin shoulder, lying snugly to the body. This shoulder and a well defined spine produce the sharpness of shoulder so much admired. The back should be straight, with spine well defined, especially forward. The tail long, firm in the bone, and set on a level with the back, without depression or notch. A fine tail usually accompanies fine bone, and the fine bone is not only decrease of offal over heavy limbs, but accompanies early maturity, and a tendency to thrift. The limbs should be fine-boned, flat-boned, and with joints of moderate size. On the forward limbs the cow should stand low. Large joints and round bones are found very frequently on dull feeders, and on animals of little profit.

XVIII. Importance of Good Teats.

The teats should be of medium length, evenly set, and project slightly outward when the bag is full, of even thickness throughout, and of fine texture. They should be placed about one-third of the length of

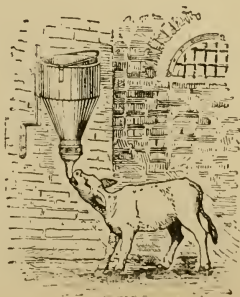
the "vessel" apart in one direction, and about one-half the other. When the udder is not distended, they should hang perpendicularly. Large teats, however desirable to the milker, are usually accompanied by coarseness of build in the cow. They are seldom found on well-bred animals, yet exceptionally they occur, and are much liked. A teat should be large enough to grasp, say from two to two and a half inches in length. A shorter one would be an objection; with larger, I should fear coarseness.

XIX. Color Style and Condition.

In color the Ayrshires vary greatly. Brown, red, and white appears to good advantage, and is fashionable. A good quantity of white, well distributed, adds style and showiness to the animal. Yellow and white is frequently seen, yet while this color is sometimes stated as indicating lack of hardiness, I am not aware of any proofs or argument having been brought forward to support this view. Color is as yet a matter of taste, for its correlations are hardly guessed at; and from almost pure black, through the reds to almost pure white, are colors found on the best cows. Black spots on the skin, barely perceptible through the hair, often occur on the best cattle. Strawberry blotched and red and white are perhaps the more common colors. A self-colored animal, or a roan, or animal with white on the ears, the writer has never yet seen among the Ayrshires in Scotland or in this country, when the pedigree was unquestionable.

The carriage should be light and active, the head well up, and the hind legs should not cross in walking. The condition should be neither fat nor lean, but that average which a good cow holds when in good flesh at calving, liberally fed while in milk.

In selecting Ayrshires, if these points are attended to, and if the breeder has carefully studied what we have previously written in relation to raising cattle in general, there will be no difficulty about the selection of superior animals.



DRINKING APPARATUS FOR CALVES—RUBBER TEAT.

CHAPTER XI.

DAIRY CATTLE—THE DUTCH BREEDS.

- I. ANTIQUITY OF DUTCH CATTLE AS A DISTINCT RACE.—II. FRIESIAN AND BATAVIAN CATTLE.—III. DUTCH CATTLE OLDER THAN THOSE OF HOLSTEIN.—IV. ESTABLISHMENT OF REGULAR CATTLE MARKETS.—V. IMPORTATION OF DANISH CATTLE INTO FRIESLAND.—VI. FACTS ABOUT DUTCH CATTLE.—VII. VARIETIES DESCRIBED.—VIII. RACES OF DUTCH CATTLE.—IX. DR. GEORGE MAY'S FESTIMONY.—X. BREEDS OF NORTH AND SOUTH HOLLAND AND WEST FRIESLAND.—XI. THEIR COLOR AND FORM.—XII. YIELDS OF MILK.—XIII. FEEDING QUALITIES.—XIV. DUTCH CATTLE AN ARTIFICIAL BREED.—XV. THE EARLIEST IMPORTATIONS.—XVI. THE LEROY IMPORTATION.—XVII. THE CHENERY IMPORTATION.—XVIII. WHAT PROF. ROBERTS SAYS.—XIX. MEASUREMENTS ADOPTED FOR DUTCH FRIESIAN CATTLE.—XX. HOW TO SELECT DAIRY COWS.

I. Antiquity of the Dutch Cattle as a Distinct Race.

The cattle now called Dutch undoubtedly trace, in an unbroken line, farther back than any other race in repute among breeders. The Friesians and Batavians long ago inhabited Holland. The history of the Friesians dates back to 300 years before Christ, and they were known more than 2,000 years ago as herdsmen, hunters and fishermen. The Batavians are said to have come some 200 years later, or 100 years before Christ. Prof. G. J. Hengerveid, of the Royal Veterinary Institute at Utrecht, Netherlands, in an exhaustive letter to the United States Consul in 1872, goes over the whole history, and without other preface we extract such portions as seem pertinent to the matter in hand:

The lands of the Friesians comprised the whole country to the north of the Rhine as far as the shore of the North Sea, to which West and East Friesland belonged, composing the present Dutch provinces of Groningen, Friesland, Drenthe, and North Holland, besides the provinces of Utrecht, Overijssel, and a part of Guelderland and South Holland. Of all these provinces Groningen alone appertained to East Friesland.

II. Friesian and Batavian Cattle.

Tacitus says of the Friesians and Batavians that they owned cattle, not excelling in beauty, but in number. He further states, as does also Julius Cæsar, that the Friesians and Batavians paid each other in cows, sheep and goats, and gave likewise to their children as dowry, oxen adapted to the yoke and plough, cattle and horses. When they were subdued by the Romans in the first century of our era, the conquerors imposed upon the Friesians an annual tribute, consisting of cow-hides and meat. The Friesians and Batavians applied themselves to the draining

of their marshy lands and their islands, and created meadows on the reclaimed soil. Something is even known regarding the color of their cattle, namely, that they held those of a white color in religious veneration. The Friesians, from Oldenburg and the country near the mouth of the Elbe, were compelled, through the inclemency of those regions—then in their original condition of low alluvial swamps, inundated at every tide—to desert them. It can also be shown that the inhabitants of this territory were unable to make sure provision for their own wants, because of the robberies and piracies committed by the Normans, by dwellers on the west coast of Denmark, people from Holstein and Schleswig, Jutes and Angles. This was between the eighth and eleventh centuries. Giving due weight to these statements, it cannot be doubted that the cultivation of cattle in the Netherlands existed a long time before such a thing could be thought of in Holstein. It is also quite as certain that the colonies from Friesland, Holland and Westphalia, carried with them their cattle to Holstein.

III. Dutch Cattle Older than those of Holstein.

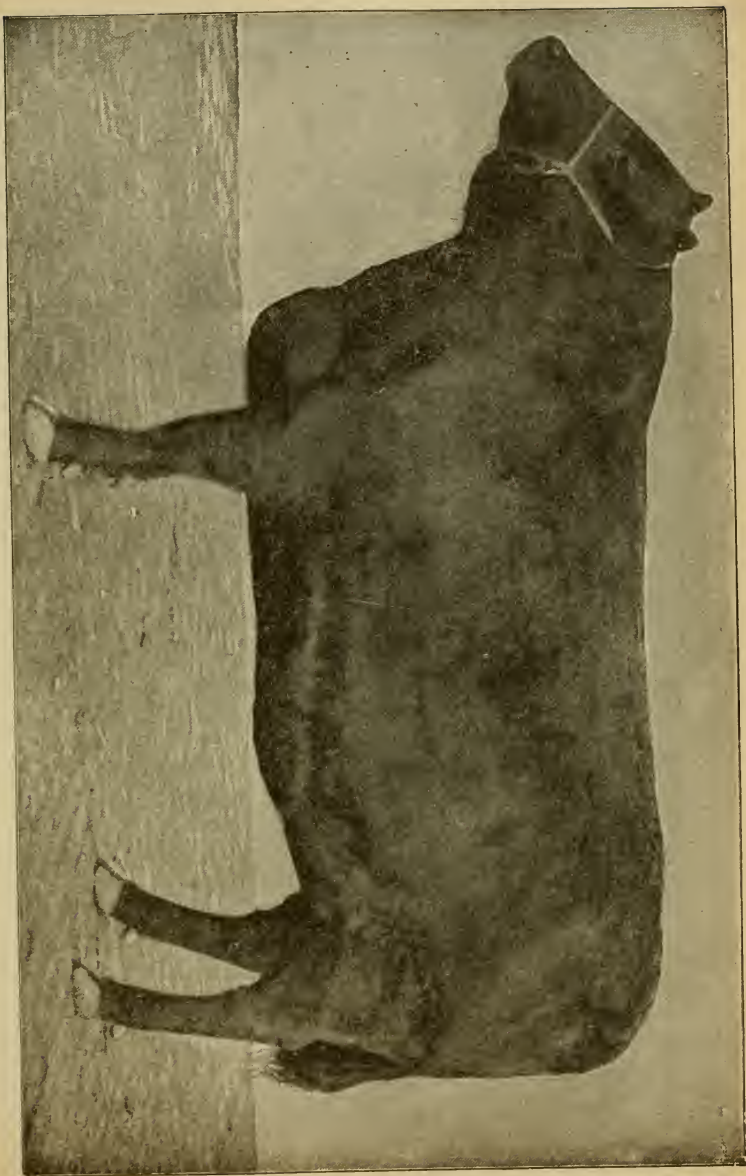
Hence we see that, first, the Dutch race of cattle date from an older descent than those of Holstein; while, probably, second, the Holstein cattle originated from the Friesian breed and from that of the Dutch and Westphalia emigrants. After this colonization, we have our attention directed to another remarkable particular in the history of Dutch cattle.

IV. Establishment of Regular Markets.

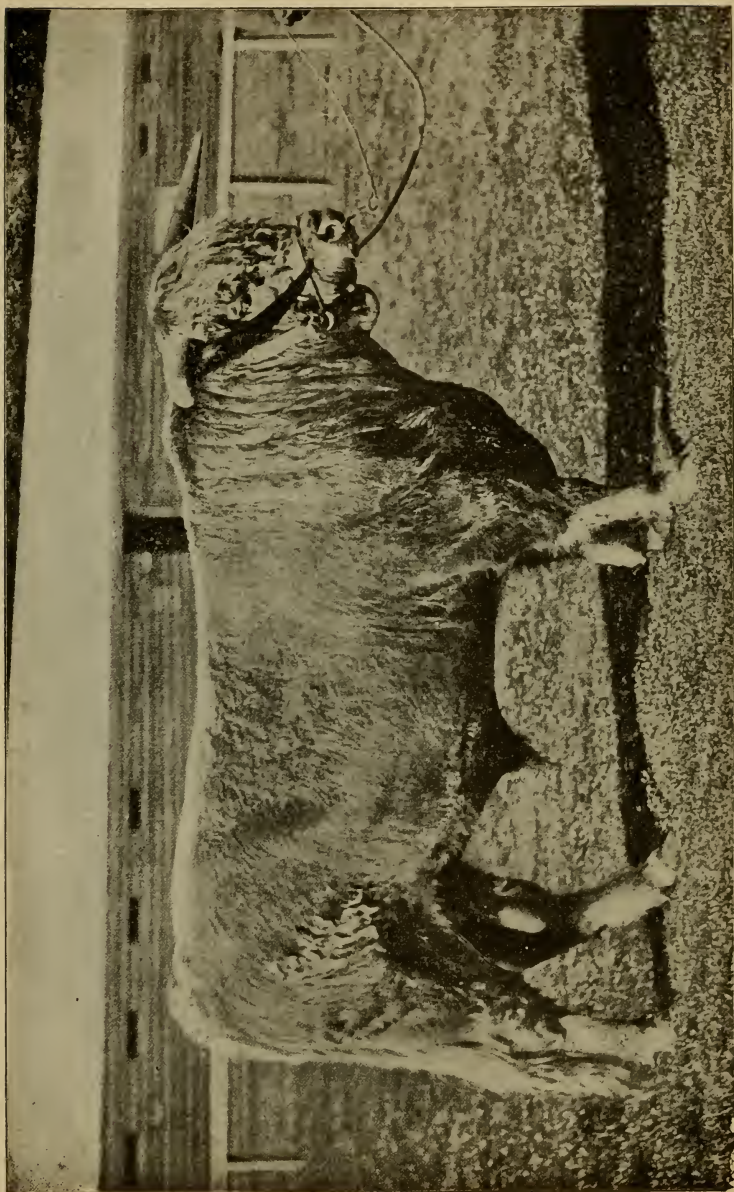
From the fourteenth on till the eighteenth century, a large number of Danish oxen were annually turned for pasture into the grassy meadows of North Holland, and sold at the weekly North Holland cattle market. The oldest of these cattle markets is that of the city of Hoorn. This market was already established in 1311, and in 1339 the Danes and the inhabitants of the Eyder, were allowed by Albrecht, duke of Bavaria, to hold a weekly market there. In 1605, the Danish cattle market was removed from Hoorn and transferred to Enkhuyzen, when, in 1624, the number of 1,179 oxen were sold. There was also in Amsterdam a lean-cattle market, beginning in the Spring, in the month of April, but held at irregular periods, depending upon wind and weather, when cattle were allowed to be conveyed thither from Denmark and Holstein to graze. These were mostly brought by vessel.

V. Importation of Danish Cattle into Friesland.

In the middle of the eighteenth century, it is mentioned that, owing to the cattle-plague, the people were compelled to import from abroad all kinds of small cattle, chiefly Danish. But, what was remarkable, however



ABERDEEN-ANGUS HEIFER, "SCOTTISH QUEEN."



HIGHLAND BULL, "LAOICH."

small and ill-favored these animals might be when compared with the handsome Friesian horned cattle, an improvement of food induced a favorable development of body, and, from the mixture of the two breeds, good and choice milch-kine were attained within two or three generations after the introduction of the foreign blood, no matter how much the race had in the beginning deteriorated through the process, and, eventually, the type of Danish and German cattle was quite lost.

VI. Facts about Dutch Cattle.

The chief characteristics of this Friesian breed—its eminent milk-giving and fattening qualities—we find in all the districts mentioned, and extending still farther southward; with this difference, however, that wherever the land is more fertile, the climate milder, and the tending, feeding and breeding of the cattle observed with more care, in that measure, they are more developed, attain larger size, and are of a finer texture.

If the intention be to convey a correct understanding of the true qualities of the several varieties or breeds mentioned in their own dwelling places, it is better that each breed should retain the name by which it is known, and that no collective name, though a historical one, should be given them.

VII. Varieties Described.

In order to be able to readily classify a group of cattle of great extent, possessing the same chief qualities in form and productiveness, Sturm proposed, so long as fifty years ago, to give to a group, subject to the same conditions of soil and climate, a name indicating those conditions, and thus originated Mountain Cattle, Highland Cattle and Lowland Cattle. He also heads each of these divisions by the breed best representing the distinctive feature of its class, *as its type*. It is under the denomination of Lowland Cattle that he places the different breeds of the coast lands along the North Sea. Schmalz, Pabst and many subsequent writers, adopt this classification, some with a few modifications. According to Schmalz's statement, cattle, adopting Sturm's classification, may be distinguished in the following manner:

VIII. Races of Dutch Cattle.

- A. Lowland Race.—Primitive cow; Dutch-Friesian cow.
- B. Mountain Race.—Degenerate, quite the contrary of A; Swiss cow.
- C. Middle Race.—Highland race; forms the transition from A to B; Frankish cow.

To the race A belong the Dutch, as representatives, the Friesian, the Oldenburg, and chiefly all Lowland races bearing the peculiar characteristics which identify it with the place of its sojourn.

This is a purely natural division, and there is not the least arrogance in asserting, what history points out, that the Dutch cattle constitute the type of the oldest, purest, and best breed. All other varieties are of less intrinsic value; they are coarser or smaller, possess less productive qualities, though of local excellence in their native places.

One hears in Europe of "Lowland cattle," but purchases of them for the purpose of improving other breeds have, for the last hundred years, only been made in the chief Netherland provinces, where the choicest cattle of the Lowlands are found. Thus, thousands of Dutch and Friesian cattle are annually sent abroad under the name of *Dutch cattle*.

IX Dr. George May's Testimony.

Dr. George May, director of the agricultural establishment at Weihe-
stephan, says: The Dutch cattle constitute the type of the properly so-called Lowland race, which extends throughout Netherlands, Flanders, Normandy, Oldenburg, and Denmark. The Oldenburg cattle descended from the Dutch race, and are likewise distinguished as East Friesian cattle, as still partially found in Hanoverian Friesland. In the adjacent parts of Bremen it is called Bremen cattle.

In the transactions of the Ohio Board of Agriculture, 1872, in an article on Dutch cattle, by Professor Furstenburg, we find the following: The breeds of cattle in Holland may be divided according to their locality as follows: 1. The breeds in the provinces North and South Holland and West Friesland. 2. The breeds in the provinces Groningen, Guelderland, Utrecht, and Overijssel. 3. The breeds in the provinces of Seeland. Although these breeds are closely related, still they show differences resulting from keeping and the various purposes for which they are bred.

X. Breeds of North and South Holland and West Friesland.

The breed most renowned in the kingdom for its milk-producing qualities is found in these three provinces. But North Holland in particular is noted for the manner of keeping cattle, which are known by the name of Amsterdam race, being no less remarkable on account of size than for the great production of milk. The pastures of North Holland are said to contain 100,000 morgen (58-100 morgen to an acre); every acre furnishes nourishment for 49-100 head of cattle. The peasants are engaged almost solely in cattle breeding, and the keeping and care which these animals receive here has almost become proverbial on account of its perfection.

XI. Their Color and Form.

The cattle here are mostly spotted black and white; however, brown and blue or gray mixed are found. The height is considerable, being not

under two Amsterdam ells, (4 51-100 feet); the length of the body in proportion to the height, the middle part of which is particularly developed. the quarters fleshy, neck rather short than long, with a strong dewlap; head narrow and long, with the forehead slightly depressed; fine horns crooked forward, and large projecting ears. The withers are often narrow; the back, on the other hand, broad across the hips, which are not very prominent; the tail fine and long, with a good tuft of hair; the position of the hind legs strong and straight (not knock-kneed), the hind-quarters broad and roomy, and the bag well developed. The lower part of the legs above the hoofs is invariably white, which is regarded as a sign of the pure unmixed breed. The live weight of the cows is 1,200 to 1,400 pounds; that of bulls reaches 2,000 pounds when full grown and fatted. The cows are usually productive of milk, and give an average of 3,000 quarts and over per annum.

A very excellent milch cow of the Amsterdam race, from the royal cow stable in Eldena, which was brought with a few others to the International Exhibition, took the first premium for milch cows of the Netherland race at the International Exhibition of live stock at Stettin in 1865. This cow, fed in the stall only, gave in one year the great quantity of 6,142 quarts of milk, and kept up afterwards to 4,000 quarts in an equal length of time.

To the breed of North Holland are nearly related those of South Holland and West Friesland, and differ perhaps only in that the latter are larger-boned, and in general of not so pleasing a form. In regard to their milk-producing qualities they are about equal. The manner of keeping the stock, and the use of the milk, is also the same, viz.: the manufacture of cheese, while the calves are raised and sold as young stock at high prices. From these three provinces, the former two of which suffered so much lately from rinderpest, milch cows are bought for the best dairies in Germany.

Holland cattle are well adapted to soiling, although at home they are accustomed to pasturage. They are kept profitably on the latter only when its abundance facilitates grazing and makes corporal exertion unnecessary. Therefore a great error would be made in placing these animals on a scant pasturage, and they are not at all adapted to the pasturage of a light soil. The result of stall-feeding is more favorable, because proper care and fodder can be given to the stock without its exertion. We have received from no other race an equal quantity of milk with the same feed, as years of observation in the cow stable of the Academy at Eldena has shown.

XII. Yields of Milk.

The yield of milk of these races was:

1. Four Toudern cows gave 9,337 quarts, or an average of 2,334 quarts, or 6 3-10 quarts per day for the year. The largest milker gave 2,345 quarts, the smallest, 2,020 quarts.

2. Three Breitenburg cows gave 8,594 quarts, or an average of 2,864 2-3 quarts, or 7 85-100 quarts per day for the year. The largest milker gave 2,946 quarts, the smallest, 2,820 quarts.

3. Three Ayrshire cows gave 5,386 quarts, or an average of 1,795 1-3 quarts, or 4 92-100 quarts per day for the year. The largest milker gave 2,249 quarts, the smallest 1,415 quarts.

4. Twenty-two Holland cows gave 78,100 quarts, or an average of 3,550 quarts, or 9 73-100 quarts per day for the year. The largest milker gave 6,142 quarts, the smallest 2,526 quarts.

The average feed per head in the Winter was daily—10 pounds Summer straw, cut fine; 2 1-2 pounds oat and wheat chaff; 25 pounds beets, 10 pounds hay; 8 pound refuse malt from beer brewery; 3 pounds rye bran. This food is considered about equal to 42 9-10 pounds hay.

During the Summer the cows were fed daily per head 135 pounds green fodder, viz., clover and vetches (of the latter very little was used), and three times a day 8 pounds of hay.

XIII. Feeding Qualities.

Although there is no doubt that the Holland cows eat more, generally, than the smaller Ayrshire and Toudern, this is of minor importance in comparison with the greater amount of milk given by the former. The greater amount of feed consumed by the Holland cows can be estimated, viz: Nine of them stood at one crib, while ten of the smaller stood at another of equal size; the fodder was, however, divided the same in each. The proportion is as nine to ten, or when the smaller cows eat 45 pounds of hay, the larger ones eat 50 pounds.

From the quantity of milk given, the Holland cows used a trifle over 5 pounds weight of lay to produce one quart of milk; Breitenburg used 6 25-100 pounds of hay; Toudern 7 pounds of hay; Ayrshire 9 pounds of hay. By these results it cannot remain doubtful which race is preferable.

XIV. Dutch Cattle an Artificial Breed.

It seems unfortunate that there should have been much feeling over the name of a breed of cattle, really the most wonderful as milkers of any known race. In the Eastern United States they are known as Dutch, Holstein, and Dutch-Friesian cattle. In the West they are almost universally known as Holstein cattle. The probability is that the name

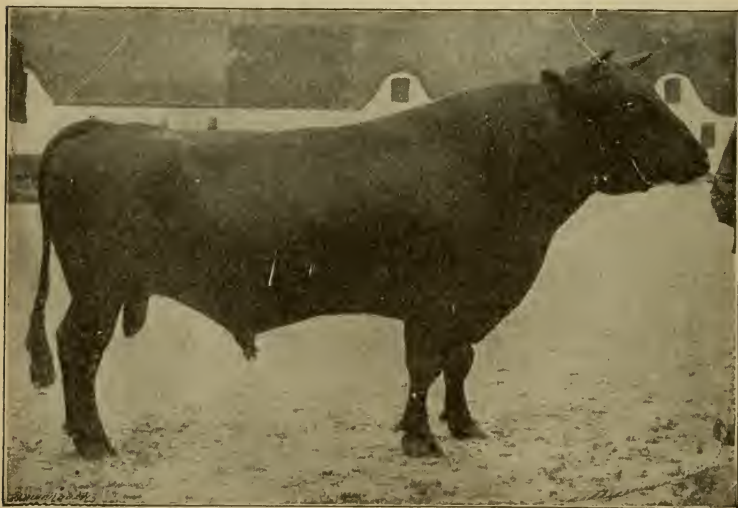


HEREFORD BULL, MARK HANNA.

Owned by H. D. Smith, Compton, Quebec.



DANISH COW.



DANISH BULL, "FAURHOLM."

Cross Breeding with the Danish Cow originated the Holstein Breed.

Friesian is more nearly correct than any other. Nevertheless, the modern Dutch cow is as purely an artificially-bred animal as the Short-Horn, the Hereford or the Ayrshire. They have been bred and selected with scientific care so long that their character is constant and uniform in capabilities for milk, and they are bred to color almost purely at the whim of the breeder, one thing alone being constant. Where they are white they are pure white, and where black they are pure black. Of late years the name, Holstein-Friesian, has been authoritatively adopted.

XV. The Earliest Importations.

It is more than probable that Dutch cattle were among the first imported to this continent, since the Dutch in their settlement of New York undoubtedly brought with them the best representatives of their breeds. It is recorded that in 1625 cattle were brought into the Dutch colony. These were undoubtedly the true Dutch cattle, since milk and labor were the two prime requisites with the colonists, and even so long ago as that date, the Dutch cattle united these points in a high degree. For as long ago as the early part of the seventeenth century (early in 1600) both Holland and England were noted for breeds of superior and deep-milking cattle. After these early importations of the Dutch and up to the early part of the present century there were probably no more Dutch cattle imported.

XVI. The Le Roy Importation.

It is stated that somewhere between 1820 and 1825, Mr. Herman Le Roy, a public spirited merchant of New York city, imported some improved Dutch cattle which were sent to his farm near the city. Between 1827 and 1829, some of the produce of this herd were sent to the farm of his son, Edward Le Roy, on the Genesee river. Mr. L. F. Allen describes this herd in 1833, as he then saw them, as being large, well-spread cattle, black and white in color, and remarkable for their uncommon yield of milk, and of great value as dairy animals; their qualities in that line were universally acknowledged wherever known.

It seems unfortunate that the Le Roys, father and son, should not have retained their herd pure, but such seems to have been the fact, for it is known that at the sale of the farms of these gentlemen, none but grades were found in the herd or in the adjacent country.

XVII. The Chenery Importation.

According to the record it seems that the first imported animals that have been retained pure, were those of Mr. W. C. Chenery, near Boston, in 1861. This was a bull and four cows, which were successfully bred and kept pure. Mr. Chenery, previous to that time, in 1852, imported

a single cow. In 1857 he made importations of a bull and two cows, and in 1859 a further importation of four more cows.



WELSH COW.

With this latter importation he was so unfortunate as to import pleuro-pneumonia. The ravages of this dread disease extended to the entire herd, and with the exception of a single young bull,

they were entirely destroyed. In 1861 Mr. Chenery made another importation of a bull and four cows, which came over sound. These and their descendants were the only pure-bred herd in America for years. That they were the best representatives of their breed is certain from the fact that they were selected with care from the best dairy herds of North Holland, and were so certified to by the official authorities of the districts where they were bred.

Later, as they gained a foothold in the West and showed their eminent adaptability to the climate, and their wonderful yields of milk became known, sagacious breeders undertook the importation as a business speculation. These cattle are now pretty well distributed from Ohio west, and, with full summer and winter feeding, are regarded by many dairy-men, especially cheese-makers, as superior to any other known milking breed.

XVIII. What Prof. Roberts Says.

Prof. Roberts, in an address before the New York Dairyman's Association, gives the following in relation to breeding and care in North Holland and Friesland, from actual observation there :

In the first place, but few bulls are kept, and these but for two or three years at most, when they are sold in the market for beef. These bulls are selected with the utmost care, invariably being the calves of the choicest milkers. But little attention is paid to fancy points or color, though dark spotted is preferred to light spotted, and more attention is now being paid to color in order to suit American customers. All other bull calves with scarce an exception are sold as veals, bringing about one and a half times as much as with us. In like manner the heifer calves are sold except about twenty per cent. which are also selected with care and raised on skimmed milk. The age of the cow is usually denoted by the number of her calves, and in no case did I find a cow that had had more than six calves, usually only four or five. Their rule is to breed so that the cow's first calf is dropped in the stable before the dam is two years old, in order that extra care and attention may be given. There are other objects gained by this method ; for should the heifer fall below their high standard she goes to the butcher's market before another wintering, and though she brought little profit to the dairy she will more than pay for her keeping at the block. Here we find a three fold method of selection. First in the sire ; second, in the young calf, judged largely by the milking qualities of the dam ; and lastly is applied the greatest of all tests, performance at the pail ; and not till she answers this satisfactorily is she accorded a permanent place in the dairy.

XIX. Measurements Adopted for Dutch Friesian Cattle.

The measurements adopted by the Dutch-Friesian Association of America in estimating value, with a view to tabulated records in future, including milk records, are as follows: 1—Length from point of shoulder to point of pelvis. 2—Length from forward point of hips to point of pelvis. 3—Width of hips. 4—Width at the thurl. 5—Height at shoulders. 6—Height at hips. 7—Girth at the smallest circumference immediately back of shoulders.

XX. How to Select Dairy Cows.

To sum up the whole matter of dairy breeds in a few words: If rich milk, without regard to quantity, is desired, select the little Jerseys.



ONE-YEAR-OLD GALLOWAY HEIFER.
Specially photographed for this work.

They will certainly satisfy the most difficult to please. If both butter and milk are wanted, our preference would lie with the Ayrshires. But if great quantities of milk excellently adapted to the manufacture of cheese were the object, we should have no hesitation in saying, the Dutch cattle will quite fill the most sanguine expectations



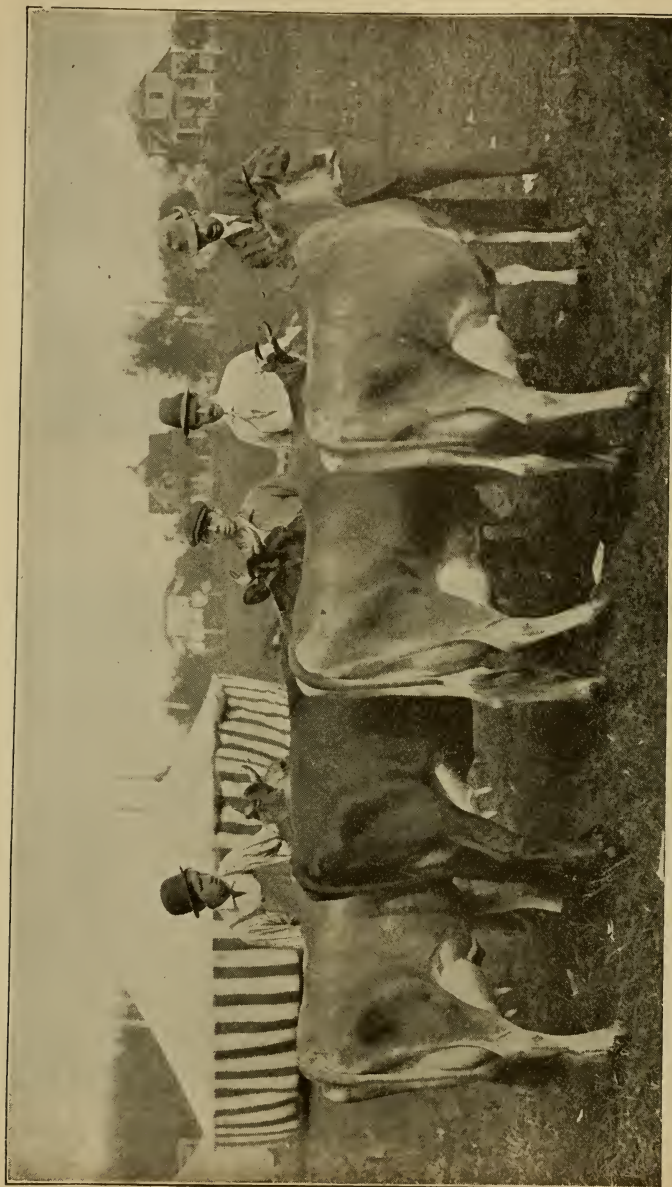
DUTCH BELTED CATTLE.
Standard Type of That Breed.—Specially photographed for this work.



BEST GROUP AFRICANDER BREED (One Bull and Three Cows)
 Champion Prize, Ladybrand Show, Also Special Prize presented by His Grace the
 Duke of Westminster for Best Family Cattle, "any breed."
 The property of Tobias van Reenan.—Photographed expressly for this work.



BEST AFRICANDER COW.
 First Prize, Ladybrand Show, The property of Tobias van Reenan.
 Photographed expressly for this work.



FOUR CHAMPION JERSEY COWS AT NATIONAL DAIRY SHOW—CHICAGO.

CHAPTER XII.

DAIRY CATTLE AND DAIRYING.

By W. D. Hoard, Editor Hoard's Dairyman.

I. A PROPER FOUNDATION FOR THE INDUSTRY.—II. CARE, HOUSING AND FEELING.—III. THE SOIL.—IV. ORGANIZATION.—V. THE GROWING OF CROPS.—VI. THE MAN BEHIND THE COW.

The title of this article purposely places dairy cattle as the foundation of the most successful prosecution of the industry of dairying. There is nothing like having a proper foundation for all human enterprises. The same may be said of the mind and judgment of the dairyman himself. If the foundation ideas he has of his business are unsound and faulty the outcome is sure to be unsatisfactory.

The development of dairy qualities in cattle is for the purpose of having an animal that will produce milk economically. But few farmers, we think, give this phase of the subject the attention they should. They have never seriously considered the wonderful modifying influence of breed over feed in the production of any given product or the economy of any animal function. To illustrate—the famous trotting horse, Jay-I-See, trotted a mile in two minutes and ten seconds on grain ration of 12 quarts of oats a day. Put a draft horse on the track and feed him four times that amount of oats and yet he could not very likely, trot a mile in eight minutes. Reverse the situation and put the trotting horse in the collar against a heavy load, will extra feeding make him equal to the draft horse in a class of work that he was not bred to perform? Of course not.

I. A Proper Foundation for the Industry.

So we see that breeding an animal to the work of a certain function increased very greatly the economic effect of that feed that must be used in support of that function. This is the reason why a well-bred dairy cow will produce from six to ten thousand pounds of milk on no more feed than a beef-bred cow would consume in the production of two or three thousand pounds. When the great body of farmers in this country clearly understands the influence of breed over feed, then will be seen much less waste of labor and feed. As the case now stands, there is an enormous waste in this direction of using ill bred and unfit cows for the work of dairying. There is a clearly seen principle—if men would look for it—running all through nature in this respect. In Mechanics we see that every machine has a form well fitted to its function. If the builder of a

machine violates that principle he is at once punished for it. This is just as true of the living Machines we employ in converting our feed into animal products.

Dairy farming may be considered under the following heads: (1) Dairy cattle, their breeding, care, housing and feeding; (2) Buildings, stables, etc., and their proper construction and sanitation; (3) A knowledge of the soil and the up-keep of fertility; (4) The proper organization of all these forces into an economic relation to each other so as to insure the highest profit; (5) The growing of proper crops and how to cure and preserve them in their highest nutritive condition for the production of milk; (6) Last, but not least, how to make an intelligent man of the farmer who shall take all these considerations and administer them to their best purpose and profit.

As will be seen from the foregoing, dairy farming is not the place for a narrow or ignorant man. It is emphatically a work of brains and wide comprehension. It is for that reason so many men make a poor success of it. They will not give it the thought and judgment it must have if it answers back in a profitable manner.

There are four distinct breeds of cattle which have been developed in their milking functions by long years of breeding and evolution. These are the Holstein-Friesian and Dutch Belted, which are somewhat closely allied; the Jersey, the Guernsey and the Ayrshire. All of these breeds have been specially bred for milk. The Brown Swiss are coming into notice but as yet have not been extensively bred in this country. They are as yet of rather a beefy build but some of the cows show most excellent milking qualities. The Holstein-Friesian, Dutch Belted and Ayrshire breeds are noted for the production of a large amount of milk of a lower percentage of butter fat and a smaller butter fat globule. These characteristics have led very greatly to their adoption for the purpose of supplying milk to the cities where only a moderately rich milk is wanted. They are also extensively used in this country and Europe for cheese making. Some of the cows of the Holstein breed have been phenomenal producers of milk and butter fat when considered from the standpoint of a year's production. The Ayrshire cow yields a milk of fair average richness. She is an animal of great hardihood and average healthfulness, and is rapidly claiming increased attention as a cow of decided merit and desirability. One peculiar feature of the Ayrshire is the harmonious "nick" with the Jersey or Guernsey. We have known of several very fine business herds that have been built up by taking grade Ayrshire cows and breeding them to pure bred Jersey or Guernsey bulls. The heifers from this combination proved to be cows of high merit. As a rule we do not advocate cross breeding, but we must make an exception in the case of the grade Ayrshire cow and Jersey or Guernsey sires. It is evident that the two currents of blood and

temperament do not meet at right angles as in the case of a cross between the Holstein and Jersey or Guernsey and thus set up a conflicting tendency in the resulting heifers.

The Jersey and Guernsey families are distinctly butter breeds, their milk averaging nearly five per cent and more, in some herds. They have the constitutional power to take grain and forage and return for it butter fat at the lowest economic cost of any of the breeds. The Guernsey also enjoys the distinction of producing milk and butter of a high color as well as very desirable flavor. Both breeds are of a distinctive dairy temperament having never been weakened in their dairy tendencies by dual-purpose or beef breeding crosses.

It is not the purpose of this article to enter into a discussion of how to breed dairy cattle but rather to enumerate general principles for guidance. The logic of breeding remains about the same in all breeds. The sire is the fountain head. From him comes the seed. It must be of the right strain and stamp and strongly prepotent of dairy tendencies. The cow is the seed-bed. This must be harmonious and well fitted to nourish the seed and start it on its way in the direction we desire. It may be said that all noted producers of great dairy cattle have placed their chief reliance on the sire. The average farmer pays but little attention to the sire. A look at the cattle he generally breeds shows how thoroughly wrong he is in his notions of breeding.

II. Care, Housing and Feeding.

The secretion of milk is a maternal function. The cow must be constructed for it in the first place. Then she must have kind and gentle treatment and her stable home must be fashioned in obedience to the one word COMFORT. The stable must be well lighted to insure her health through the antiseptic effect of sunlight. It must be well supplied constantly with fresh air that she may have the means to oxygenate her blood from which is secreted the milk. The circulation of blood from heart to lungs; lungs to the udder and back again to heart in a cow that gives twenty-five to forty pounds of milk a day is enormous. Think of a farmer who will shut up a herd of cows in a close, dark, unsanitary stable, leaving them to poison themselves with foul breathed-over air, and then expect good, profitable results from such blind folly. A cow lives on what she eats, drinks and breathes. If the food or drink is poisoned, foul or unfit, she feels it, and so if the air she breathes is poisoned, the effect is the same. Remember that oxygen is food. The blood is purified and nutritioned from the air. Poisoned air means a poisoned animal. The only satisfactory system of ventilation is what is known as the King System. Stables for northern latitudes should be constructed with two to three dead air spaces in the walls with plenty of windows and equipped with the King

ventilation. They should be thoroughly cleaned and swept each day, whitewashed once or twice a year and frequently disinfected. The manure should be taken to the field each day if possible. The water supply must be pure and the ration properly balanced so the cow can find in the food sufficient milk elements to enable her to do her most natural and perfect work. There is such a thing as feeding a cow according to dairy knowledge and the farmer that hath it not and will not seek it fails of his purpose.

III. The Soil.

The dairy farmer must be a good soil manager. He should know something of the chemistry of soil. He should know what nitrogen, phosphate and potash mean and their effect on crops. Because of a lack of this knowledge, vast areas of farm lands in the United States have been robbed of their producing power. Every farm should be so farmed as to constantly increase its producing power. Every farmer should be an earnest student of his soil. He should hail with a warm welcome all that science and scientific men have to give on this subject. The old dairy districts of New York, New England, Pennsylvania and Ohio have gone down in producing power because the men who owned and managed those farms did not know enough to keep up the fertility of their farms. There is no escape from this indictment. Soil robbing comes from soil ignorance. We must face our responsibility to the soil, to coming generations and to the state with less flinching and less self excusing.

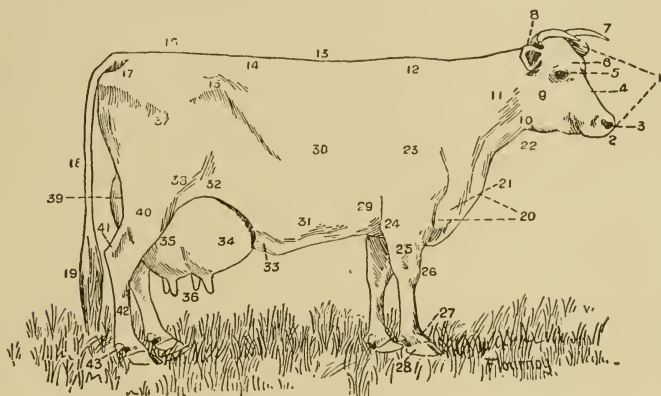
IV. Organization.

Every dairy farm should be intelligently arranged as to the relation of field to field, house and out-buildings to each other so that the whole may, like some well arranged factory, be carried on at the least expenditure of labor and the greatest degree of efficiency. A great many dairy farms look as if the several parts had been thrown together. Farm architecture and arrangement is an important part of our study and efforts are being made in Agricultural Colleges to express the best thought of the day. This includes farm machinery and provision made for its shelter when not in use. Here as well as at every other point thought and effort must be had to stop waste and thus add to profits.

V. The Growing of Crops.

Corn, both for the silo and the crib, clover and alfalfa, oats and barley, as well as the up-keep of pastures, constitute in the main the crops of the dairy farm. To the end that these crops may be abundant and stable and the soil constantly made more productive, there must be a wise care of manure, a right system of rotation and the expenditure every year of a

certain amount of money for phosphate and lime and, if needed, nitrogen and potash. Unless we vigorously look after the productive power of our soil we cannot successfully grow the crops we need. Corn, clover and alfalfa are the sheet anchors of the dairy farmer. He must see to it that the necessary elements of the soil are supplied by purchase. To be niggardly here is to punish himself all the more. Still more he must keep up the humus of the soil. To this end he must occasionally plow under a second crop of clover or the fourth crop of alfalfa. A liberal spirit here will bring him a liberal reward. Most of our old soils have become sour



POINTS OBSERVED IN JUDGING DAIRY CATTLE.

- | | | | |
|--------------|------------------|---------------------|-------------------|
| 1. Head. | 12. Withers. | 23. Shoulder. | 34. Fore udder. |
| 2. Muzzle. | 13. Back. | 24. Elbow. | 35. Hind udder. |
| 3. Nostril. | 14. Loins. | 25. Forearm. | 36. Teats. |
| 4. Face. | 15. Hip bone. | 26. Knee. | 37. Upper thigh. |
| 5. Eye. | 16. Pelvic arch. | 27. Ankle. | 38. Stifle. |
| 6. Forehead. | 17. Rump. | 28. Hoof. | 39. Twist. |
| 7. Horn. | 18. Tail. | 29. Heart girth. | 40. Leg or gaskin |
| 8. Ear. | 19. Switch. | 30. Side or barrel. | 41. Hock. |
| 9. Cheek. | 20. Chest. | 31. Belly. | 42. Shank. |
| 10. Throat. | 21. Brisket. | 32. Flank. | 43. Dew claw. |
| 11. Neck. | 22. Dewlap. | 33. Milk vein. | |

They need occasional applications of lime in the form of ground lime stone, ground marl or the refuse lime from sugar factories. Quick lime should not be used as it will burn out the humus and thus destroy the nitrogen of the soil.

VI. The Man Behind the Cow.

Last but not least we may consider the equation of brains in the business of dairying. At each point it is the determining factor. Too large a

proportion of the men who keep cows, supposedly for profit, show but little real dairy intelligence in their work. There is a lack of intelligence in the breeding of the cow; the same lack of understanding in her care and feeding; a decided lack of knowledge and judgment in farm management. Everywhere are we confronted with men trying to win profit out of this business with too low a grade of intelligence.

It is not enough that a farmer wants to make money in dairying. That will not make him an intelligent man capable of seeing where good profit lies. The touchstone to it all lies in the fact whether he takes a *mental* interest in dairying or only a sordid one. If it be a mental interest you will see him calling to his aid the books and papers that constitute the literature of his business for it does have a literature. Science has contributed so much to this industry in the way of cattle breeding; the analysis of feeds; the bacteriology of milk and the relation of bacteria to the diseases of cattle; the sanitary construction of stables and care of the cow; and finally the question of maintaining the feed-producing power of the farm, that the truly successful dairyman must be a broadly intelligent man. He cannot be that kind of a man unless he is a reader and student. He must devote some time and money to his own dairy education. He cannot exercise good discerning judgment upon all the problems of dairy farming unless he has a well-stored mind. The home of the true dairy farmer should be a place of culture and mental grasp as much so as the home of the lawyer or physician. They will find that the dairy farm will challenge all the brain power they can bring to bear upon it. It is the seat of deep problems in vegetable and animal life. There has come a great intellectual awakening on this thing we call dairy farming. Our crowded Agricultural Colleges and dairy schools; the greatly increased demand for thoroughly practical dairy papers and books; the massing of the best scientific minds of the day in research and study concerning the discovery of dairy truth; all these show conclusively that the dairy farm is no place for the ignorant, unthinking and non-reading farmer. The young men of today see this. True financial success awaits him only who will welcome knowledge with an open hospitable mind.

"MISSOURI CHIEF JOSEPHINE."

The Champion Dairy Cow of all the World.

A PRACTICAL LESSON IN THE TREATMENT, FEEDING, WATERING AND MANAGEMENT OF MILK COWS.

The College of Agriculture in the University of Missouri, at Columbia, has raised and developed the Champion Dairy Cow of all the World—"Missouri Chief Josephine," a Holstein-Friesian. Her record in the production of milk for six months is 17,008.8 pounds, which exceeds the previous world's record for six months by 1,458 pounds.

It is believed that without doubt Josephine will make a further great record in the production of butter as well as milk. Her butter production for six months amounts to 529 pounds, or nearly three per cent. As she gets further along in her test the butter fat increases. On an average test for one week it came to 4.1 per cent. A little more than a half pound is the amount of butter available from the average dairy cow's daily production. Josephine's butter production is between three and four pounds daily.

The 17,008.8 pounds of milk which she gave in six months gives her an average of 93.4 pounds of milk daily for 182 days. This is equivalent to 46.7 quarts or 11.6 gallons every day. Her highest record for one day is 110.2 pounds, about 56 quarts or 14 gallons of milk, more than the average healthy dairy cow gives in one week. She gives more milk in two months than most cows give in a year. One can better comprehend the enormity of the bulk of this cow's production when he realizes that, as large as she is—weighing 1,370 pounds at the end of her six months' test—Josephine produces more pounds of milk in six months than twelve times her own weight, more than twice her weight in milk each month; or, if you please, her own weight in milk every two weeks.

Another way to get at this is to compare her production to the nutrition obtained from beef. According to a bulletin issued by the University of Missouri, Josephine's milk production for six months is equivalent to "More human food than is contained in the carcasses of three steers weighing 1,250 pounds each. This amount of milk is more than equivalent to the nutrition obtained from 5,000 pounds of round steak."

At the rate of 15c per pound for round steak, Josephine's milk for six months is worth more than \$750.00, or more than \$1,500.00 for a year. Since the average man's yearly income, according to the yearly



MISSOURI CHIEF JOSEPHINE.

This cow holds the world's record for milk production in a continuous period of six months. During the six months, ending July 17, 1910, she produced 17,008.8 pounds of milk, an average of 93.4 pounds per day, 46.7 quarts or 11.6 gallons per day for 182 days.

statistics, has been estimated at \$500.00, Josephine annually produces more in actual valuation than the earnings of three average men. If the average man, however, were as well cared for as Josephine is, he would unquestionably produce more than he does. The same fact is true of the average cow. "Chief Josephine" receives the constant care and attention of experts. The foreman at the dairy farms at the College of Agriculture in the University of Missouri is her chief attendant. He lives on the farm close to where Josephine's stall is located and during the test here noted he is said to have practically slept with one eye upon her. He is qualified for the work by long experience and has made much reputation for producing dairy cows—perhaps more than any other dairyman in the world. In the management of "Chief Josephine," he has economized her strength and force, and in order that she may waste no energy in digestion, her food is ground into powder and soaked in water before being served to her. Although she consumes daily 132 pounds of this wet feed, besides the alfalfa hay and corn silage, she never gets enough. The feed pan in which she is fed four times every day is exhausted each time. Water is the only thing of which she gets enough. She is allowed to drink water as long and as much as she wants. Her thirst is quenched every day by at least 270 pounds of water, or about 30 gallons. The water she drinks is warmed to a temperature of about 70 degrees, the condition best suited to milk production.

It costs about 77c a day to keep Josephine and her daily production is worth over \$4.00 at prevailing prices. On being asked if that cost included the manager's labor and the cost of the electric fans in her stall, the reply was "No, that is the cost of her feed alone; but I did not include a \$3,000.00 calf in her production either." The calf is worth \$3,000.00 now, and will be worth more when its mother completes her year's test. Josephine's value estimated on her six months' record is \$20,000.00. When she has completed her year's test with the world's champion record for the full year, as well as for the six months, she will be worth two or three times as much as she is now.

The box stall in which Josephine is kept is screened and white-washed on all sides. A large electric fan suspended above her from the ceiling keeps the few flies that get in from annoying her. Another smaller fan sits in the corner next to a window furnishing a cooler breeze of fresh air from the outside. She is kept in her stall all day, except when taken out for her shower baths and exercises. At 4:30 o'clock in the morning she is brushed off and given exercises in the lot. At 5 o'clock she receives her breakfast of six pounds of pulverized grains, bran, corn-chop, ground oats, gluten, linseed meal and cottonseed meal, with about three ounces of salt mixed with each twelve pounds of beet

pulp, soaked with 25 pounds of water. She is fed 40 pounds of green hay and silage and about 10 pounds of dry alfalfa.

She is watered at 8 o'clock in the morning, 2 o'clock in the afternoon and 10 o'clock at night, drinking all she wants each time. During the warm weather she is given shower baths daily, the number varying according to the intensity of the heat. In clear weather she is allowed to spend a part of the night exercising in the lot, but if a rain comes up during the night she is hurried back into her stall.

She spends most of her time lying on the sawdust-covered floor of her stall, yet Josephine is a hard working animal according to statement of one of her attendants. "See how fast she chews her cud," this attendant said one day. "That is the way all hard working cows do. You can always tell a good milk producer by the way she chews her cud. Joe, as she is called around the barn, chews about two or three times as fast as the ordinary cow."

Josephine is never struck or allowed to be excited in any manner, because any nervous shock causes a decrease in her milk production. For example: On one occasion when the electricity which furnished the power for her fans was shut off, leaving her to fight flies and suffer the intense summer heat of Central Missouri, her milk flow decreased from 96 pounds daily to 74 pounds daily—a decrease of 18 pounds or $2\frac{1}{4}$ gallons—which is as much as the average dairy cow's production.

Her keepers claim that this championship race is a commercial, not a fancy test. To prove this, it is shown that the former world's champion dairy cow had made her record after a rest of three years, while Josephine's record is being made after doing her full duty as a dairy cow in the University herd during the last $5\frac{1}{2}$ years in raising five calves.

"Chief Josephine" is now eight years old. She is of the breed called Holstein, otherwise known as Friesian or Holland. She is only about three generations removed from the rich lowlands of Dykes and Windmills in North Holland and Friesland, her ancestors having been brought to the United States about thirty-six years ago.

In color, she is black and white like the rest of her breed, the white predominating in her particular case. Her udder is unusually large, being long and extending well behind. Her teats and milk-veins are very large and prominent.

Methods of Milking.

Milking the cow is such a simple operation and one that occupies in the aggregate so much time, that it is easy to become careless about it and to look upon the operation as one not requiring skill nor demanding scien-



Fig. 1.—First manipulation in the Hegelund method of milking.

tific investigation. The feeding has received careful attention, both by investigators and farmers, until it is now probably correct to say that the cow in the hands of the progressives is more scientifically fed and nourished than most children. The ventilation and sanitation of stables has



Fig. 2.—Second manipulation in the Hegelund method of milking.

also been the subject of much discussion, but it is certainly a fact that the art of milking has not received the attention it deserves, at least not until very recently.

The Hegelund method of milking, which is really a series of manipulations of the udder, is described as follows:

First Manipulation.—The right quarters of the udder are pressed against each other (if the udder is very large, only one quarter at a time is taken) with the left hand on the hind quarter and the right hand in front on the fore quarter, the thumbs being placed on the outside of the udder and the four fingers in the division between the two halves of the udder. The hands are now pressed toward each other and at the same time lifted toward the body of the cow. This pressing and lifting is repeated three times, the milk collected in the milk cistern is then milked out, and the manipulation repeated until no more milk is obtained in this way, when the left quarters are treated in the same manner. (Fig. 1.)

Second Manipulation.—The glands are pressed together from the side. The fore quarters are milked each by itself by placing one hand, with fingers spread, on the outside of the quarter and the other hand in the division between the right and left fore quarters; the hands are pressed against each other and the teat then milked. When no more milk is obtained by this manipulation, the hind quarters are milked by placing a hand on the outside of each quarter, likewise with fingers spread and turned upward, but with the thumb just in front of the hind quarter. The hands are lifted and grasp into the gland from behind and from the side, after which they are lowered to draw the milk. The manipulation is repeated until no more milk is obtained. (Fig. 2.)

Third Manipulation.—The fore teats are grasped with partly closed hands and lifted with a push toward the body of the cow, both at the same time, by which method the glands are pressed between the hands and the body; the milk is drawn after each three pushes. When the fore teats are emptied the hind teats are milked in the same manner. (Fig. 3.)

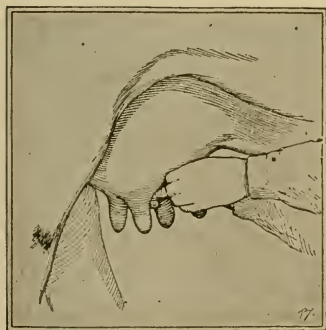


Fig. 3.—Third manipulation in the Hegelund method of milking.

In trials of this method on 142 cows the average amount of residual milk obtained was about 1 pound per head daily, the average butter fat in the milk. The average fat content of the herd milk obtained in the regular milking was 4.29 per

cent, of the residual milk 10.32 per cent, or 2.4 times as large as the former. The time required for after-milking by the method was from two to three minutes.

CHAPTER XIII.

THE RAISING AND ECONOMICAL FEEDING OF CATTLE.

- I. IMPORTANCE OF PROPER CARE WHILE YOUNG.—II. DIFFERENCE BETWEEN GOOD AND BAD CARE.—III. THE STARVED CALVES AT GRASS.—IV. THE OTHER SIDE.—V. GOOD WINTER KEEPING FOR CALVES.—VI. WHEN AND HOW TO CASTRATE.—VII. GENERAL CLASSES OF CATTLE.—VIII. SPECIAL CLASSES.—IX. FULL FEEDING AND EARLY MATURITY.—X. ECONOMY IN FEEDING.—XI. THE TRUE POLICY WITH YOUNG STOCK.—XII. FEEDING THE YOUNG CALVES.—XIII. FEED GRASS AND OATS EARLY.—XIV. WHERE THE PROFIT COMES IN.—XV. FEEDING FOR BEEF AND FOR LABOR.—XVI. REACHING RESULTS.—XVII. WHEN AND HOW TO FEED.—XVIII. OUT-DOOR FEEDING WHERE CORN IS CHEAP.—XIX. A GOOD CONDIMENT.—XX. SO-CALLED PERFECT FOODS.

I. Importance of Proper Care while Young.

There is no more important factor in the management of cattle than proper care while young. Those who imagine that they are doing the correct thing if they can manage to keep life in a calf until it is three months old, and then have it get fat on grass before winter comes, always have a set of "scrawns," with their digestive organs destroyed by improper food, and which never make either healthy steers or cows. They are always runts—contemptuously called "scalawags," by the butchers in our markets—and sell for one and a half to two cents a pound, when good cattle are worth from four and a half to six cents.

II. Difference between Good and Bad Care.

A single illustration will suffice. One man will give calves new milk until they are six weeks old, and then gradually reduce the quantity, substituting oat-meal porridge or fine corn-meal mush, with a very little linseed added, or mixing equal parts of oat-meal and corn-meal in the milk, until the calf is four months old. Then it will do well on soft grass and oats.

The other man takes the calf from the cow at one day old, and feeds it skim-milk until the age of three weeks, when half-cooked, coarse meal—husks and all—is mixed with the milk; and finally at six weeks or two months old, the calf is turned out to grass, receiving, perhaps, an occasional ration of sour whey. It is poor, does not grow, takes "the scours," which is only another name for indigestion, and if the animal gets through the first winter with what such a man calls special nursing, and occasional greasings with "anguintum," to kill lice, he finds himself the possessor of a scrubby yearling, ready (?) for grass, that will weigh skin and bones, from seventy to ninety pounds.

III. The Starved Calves at Grass.

He expects his calves to get on their feed the next summer. Calves are endowed with great vitality, and if their stomachs recover something of tone, they will have shed their old hair, (what has not been eaten out by vermin) by the first of July, and by fall, if it be a good year for grass, they will be in half-decent store condition, and perhaps weigh 150 to 170 pounds each. That is, they will have gained from sixty to eighty pounds of flesh, each, to cover their bones. They are at the end of eighteen months, just where a good calf should have been at weaning time the fall



BADLY WINTERED.



WELL WINTERED.

before, but with constitutions ruined so far as profitable feeding is concerned.

Thus, this kind of feeding goes on; starved in winter and allowed to shift for themselves in summer, at the age of three years they will average 800 pounds, gross weight, if no epidemic seizes them.

IV. The Other Side.

The common-sense feeder keeps his calves growing right along, with plenty of new milk until their stomachs are capable of digesting solid food, when meal mush is added, and the cream taken from the milk. As soon as they will eat oats and grass, they are given as much of these as they want; and in the autumn, when ready for wintering, it would not be strange if they should average 200 pounds each.

V. Good Winter Keeping for Calves.

They are given warm shelter and the best and softest hay, with a generous allowance of meal daily. So they grow right along, and may be made to gain a hundred pounds during the winter. The next summer they are kept on flush pasture, or, if grass is bad, they get some corn, with plenty of pure water, and a place is provided where they may escape flies. Thus at three years old the steers are heavy beeves, and the heifers will have produced a fine calf, each, and be ready to do justice to them in the way of nourishment.

VI. When and How to Castrate.

Many persons put off gelding their calves until they are six months old, and often until they are a year old. This will do if "stags" are wanted; but stags, however fat, sell for one or two cents a pound less in the market than steers. The proper time to geld bull calves is not later than the age of four weeks.

When the calves are about three weeks old, drive them into a close pen. Secure a calf so it may stand at ease, but not struggle severely; or, it may be thrown on the left side for the operation.

Seize the scrotum with the left hand, and press the testicles rather firmly to the bottom; with a keen blade, rounded at the point, cut at a single stroke down through the scrotum and into the testicles, first one and then the other. Separate the membrane carefully, but quickly, when it unites, and draw out the testicles until about six inches of the cords are visible. Cut the cords, first one and then the other, with a pair of dull shears (this prevents much bleeding), and let them pass back. If severe bleeding ensues, inject a little muriate of iron into the cavity, and wet a soft rag with the same and pass it gently into the cavity. Some use salt and lard, but this is painful. So proceed until all are castrated, and then turn them into a place where strange cattle or flies will not molest them.

It is as little dangerous, this mode of castration, almost, as cutting one's finger. The parts should heal in a week. Castration often comes awkward to the beginner, but it soon becomes easy, if fearlessly and carefully practiced.

VII. General Classes of Cattle.

(1) Beef cattle.—This class includes all grades of fat steers and heifers; also everything from common to prime and from light to heavy. It is finished condition that brings animals into this class.

(2) Butcher stock.—This class includes animals that have not fattened well; also animals that have not been fed long enough to become properly fattened. It seldom includes steers of really good quality, as such will usually be sold as feeders. The bulk of butcher stock is made up of cows and heifers.

(3) Cutters and canners.—In this class are included old, thin cows and very thin bulls, steers, and heifers. The cutters must carry sufficient flesh to permit of the loin or rib or both being used for cutting on the block. Those animals which are so thin that no part of the carcass can be used for block purposes constitute the canners.

(4) Stockers and feeders.—This class includes calves, yearlings, two-year-olds, and older cattle. Cattle 18 months old or older which are ready for immediate use in the feed lot are called feeders. Those which are younger are referred to as stockers.

(5) Veal calves.—This includes all calves which are sold for immediate slaughter.

VIII. Special Classes.

The above general classes really comprise everything in the way of cattle sent to the markets. But there are a number of special classes generally recognized which require to be named and defined.

(1) Texas and Western range cattle.—A few years ago the typical Texas steer had very long horns and long legs, was thin and narrow-bodied, and carried a large deep brand; and most of the cattle which came from Texas were of this description. But this type is rapidly disappearing. Animals of the best beef breeds have been imported into the State and used for breeding purposes, especially for crossing with the native stock, so that now many of the Texas cattle compare favorably with those from other sections of the country. There is, however, a very wide range between the best and the poorest.

The Western range cattle are classed with the Texas cattle, because formerly they were made up largely of Southern cattle which were driven northward to winter on the ranges north of the quarantine line. Now, however, a large percentage of the animals in this class are bred on the ranges of the West and Northwest.

All the cattle in this class are branded.

(2) Distillers.—These are cattle that have been fattened on the by-products of distilleries. Formerly only inferior grades of cattle were purchased for feeding on distillery residues, but at present many feeders of better grades are used. When sent to market these cattle are preferred to others of the same grade, because they dress out a higher percentage of beef.

(3) Baby beef.—This term is applied to choice or prime fat steers between 1 and 2 years old, weighing from 800 to 1,000 pounds.

(4) Export cattle.—The cattle exported are in the main good to choice steers, weighing from 1,200 to 1,500 pounds. Comparatively few prime beef steers are bought for export, because of the high price they bring in the home market.

(5) Shipping steers.—This term applies to the animals purchased in the western markets for shipment to the large eastern markets of the United States. They are mainly of medium and good grades and range in weight from 1,150 to 1,600 pounds.

(6) Dressed beef cattle.—This class includes such cattle as are purchased by the large packing concerns of the Middle West. The packers prefer medium to choice steers, weighing from 1,200 to 1,400 pounds, to make up the bulk of their purchases, but conditions of supply and demand cause them to purchase animals of a much wider range in grade and weight, the extreme range in weight being from 800 to 1,700 pounds.

(7) Stags.—This class includes such animals as have reached or at least approached maturity before castration, and hence have the general conformation of bulls. Comparatively few of these come to the general markets, and they are of a wide range in quality, condition, and weight.

In the foregoing we find a steer one year old and under two, weighing 1,193 pounds—as much as could be expected from a fairly-fattened four year old fed as the average farmer feeds. Does any one suppose the feeder spent as much on that yearling as the farmer ordinarily does on his four year olds?

IX. Full Feeding and Early Maturity.

By studying the foregoing it will be seen that the best gain was in the steer one year old and under two, the next best is a steer two years old and under three, and the third best gain is another steer two years old and under three. The four-year old steer made the least average gain, and the older the steer the less was the daily gain.

Every observing farmer knows that a calf allowed to run out during the winter and shift for himself with the other cattle, if fed on hay, with perhaps a nubbin of corn now and then, will weigh less in the spring than it did the fall before. And those who have tried both systems of feeding (full feeding from birth, with proper shelter, and allowing young stock only hay with such shelter as they may be able to find) know there is no profit in the latter, but absolute loss.

There are, indeed, places where hay may be had simply for the making, where the grazing is ample and where cattle may be raised at a minimum cost, if good shelter is provided. But year by year such sections are being more and more contracted, through the settlement of the country. As a rule, the best profits are now made by the seeding of meadows and pastures, by providing good shelter, and by the cultivation of corn enough to carry the stock in good condition through the winter. This is really the basis of profitable feeding in the West and South-west.

X. Economy in Feeding.

We have striven throughout this work to show that in the rearing of stock, the same strict attention to business principles should prevail that is necessary to success in any other calling. There must be a strict accounting of profit and loss, else no man can know, except in a haphazard way, whether he is making money or not. The feeder should know, in a general way, what food containing the elements of growth and possessing fattening qualities is cheapest. This, of course, will vary with different sections of the country.

An experience of forty years in the West has taught us to rely principally on corn for all kinds of stock. For cattle, when the price was forty cents a bushel or less, unground corn has been found the best; while for horses, sheep and swine, our experience has been that it does not pay to grind when the price is below sixty cents, for these animals masticate or

grind their food pretty thoroughly. For fattening cattle we prefer, first, shocked corn, next snapped corn—that is, corn snapped from the stalk with the husk remaining—and next, husked corn in the ear, the waste to be gathered by store hogs. We have found that, with good shelter, five pounds of corn and ten pounds of good sweet hay per day was a good fattening ration to each 1000 pounds weight of steers fed.

When feeding shock corn, give all the animals will eat clean as to the ears. They will take what blades are needed, and stock steers may follow to glean, with stock hogs after, to pick up what grain is wasted or left in the droppings. Sheltered from winds and storms the stock may thus be economically fed to heavy weights.

For young and growing cattle there is nothing better than equal weights of corn and oats, or corn and barley ground together, whichever may be cheapest, with plenty of good hay or corn fodder that has been shocked before frost. In the South cotton-seed meal, and mill stuff may take the place of corn and oats, or corn and barley, while pea vines, or other good fodder natural to the climate, may be used instead of hay. The economy of feeding, may thus be summed up: First, good shelter; second, plenty of food to keep the animals constantly improving, and third, feed whatever substantial and nutritious food may be cheapest.

XI. The True Policy with Young Stock.

We may be allowed to repeat nearly verbatim what we have before written upon the subject of raising young cattle. The breeder and feeder must exercise sound and careful judgment. It will not pay to starve even the commonest stock. A calf, to use a common expression, “knocked in the head with a pail of skimmed milk,” will never make a first class steer or cow. Neither is it necessary that they suck the cow. In fact, in the case of the dairy cows or heifers intended for the dairy, they should not suck, for it surely tends to diminish the flow of milk, except the calf is turned with the cow at stated intervals, and the cow milked clean at the same time. In the case of heifers, they should be milked as soon as the calf has drawn the first milk, both as a means of training and to develop the flow of milk as much as possible; besides this, a calf taken at two or three days old is easily taught to suck the finger or an artificial teat attached to a reservoir.

XII. Feeding the Young Calves.

For the first two or three weeks they should have nothing but new milk. It should be as warm as it comes from the cow, and the calf should be fed four times a day. Then they may have milk twelve hours

old, from which the cream has been taken, adding four ounces of finely ground meal made into thoroughly cooked mush, to each meal, for strong, hearty calves. Thus they may be fed for two weeks more, changing to oat-meal or wheat flour if the calf is inclined to scour. Some feeders add a teaspoonful of linseed meal once a day; it is not a bad plan. When the calf is four weeks old it need be fed but twice a day, giving milk warmed to about ninety or ninety-five degrees, which last is the natural animal heat. From this time on, more and more mush, or its equivalent, may be added as the calf increases in size and strength, until it begins to eat grass and threshed oats, which it should be encouraged to do.

XIII. Feed Grass and Oats Early.

At ten weeks old the calf should eat freely, and at three months old it may be gradually weaned from milk and taught to subsist on grass and oats. During all this time the calf should be sheltered from the hot sun and rain, by providing a shelter to which it may retire, well ventilated, dry and clean, and sufficiently dark to keep out green-head and other biting flies. In the autumn its rations of grain should be increased, and as grass fails the finest meadow hay should be substituted—whatever it will eat clean of both. Offer it water occasionally after it is a month old, and when weaned see that it never lacks for water.

XIV. Where the Profit Comes In.

If during the winter you have kept the calves in the warmest quarters possible, and fed liberally with grain and hay, in the spring you will have received the best profit that you will ever reap from the animal at any subsequent age; but upon comparing debit and credit with your neighbor who has fed skim-milk alone in summer and poor hay in winter, you will find that the loss on his calves has gone in the shape of profit in yours.

From this time on feed liberally of grain in the winter, and give a little all summer when they will eat it. Let them be so warm in winter that they never become chilled. So continue until the animal is within six months of being ripe for the butcher. Then feed the best you can, and you will find that you will get two to three cents a pound, gross weight, more than your neighbor who has only half fed and has turned off his cattle totally unfit for the butcher.

The same rule will hold good for those calves intended for cows. To make a good cow, she must be fed well to bring early development and maturity. She may thus be brought forward strong and lusty, and in better condition at two years past to bring you a perfect calf, than those of your neighbor at twice that age, whose policy has been to grudge them feed and allow them to shift for themselves.

XV. Feeding for Beef and for Labor.

The following, originally written for the American Encyclopædia of Agriculture, contains in the extracts given the gist of our conclusions on the subject of feeding:

The time is long since passed when it is considered true economy to allow young stock to shift for themselves without the intelligent care of the master and proper feeding. The most successful feeders of to-day feed all stock liberally, and such as are destined for human food, are fed fully from birth, and until ready for the butcher's block. But the system of forcing is carefully avoided with all stock intended for either labor or breeding. The object here is to develop strong constitutions and ample bone and muscle, that a long and useful life may result. Hence a different class of foods are used from those intended for mere fattening. In this, again, the question of the proper foods to be used becomes important.

XVI. Reaching Results.

The food must be perfect food; that is, adapted to the special requirements of the animal. Young animals; those required for labor; those to be used for fast driving, and those ready for feeding ripe (fully fat) each require different food, and, indeed, different care.

In the fattening of animals, the sooner they can be brought up to a fully fat weight, the greater will be the profit; a weight of, say 1,500 pounds for cattle, 300 pounds for the large breeds of swine, 200 pounds for the small breeds, and from 100 to 150 pounds for sheep, according to the breed. To do this they must be pressed forward from birth, by means of the food best adapted to the animal, and marketed before they become fully grown. In summer a pasture containing a variety of good grasses will furnish this perfect food. If anything is needed more, it may measurably be found, for fattening, in Indian corn, or meal as a supplementary food, to be given at night.

For young animals, working and fast driving stock, oats are proper. The two first, however, may have any kind of mill stuff, with profit, if cheaper than oats. In the winter all stock, in addition to good, sweet hay, should receive daily such grain as will best answer the end, except that corn meal, or corn, may constitute a part of the daily ration for all classes of stock, since more fat is required for the animal waste than in summer.

For dairy stock the young animals should be fed identically as for working stock, but not forced, since sufficient frame-work for continued usefulness must be provided. Milking stock may receive largely of corn meal, in winter, and ground rye, oats, barley, or mill feed, according to relative prices.

Another important matter is the necessity of changing their diet. Animals will live on one particular food. They will even thrive for a time ; but the best results, economically considered, have always been gained by varying the food, according to the appetite of the animal. The change from green to dry, and dry to green food, however, should not be made too suddenly.

XVII. When and How to Feed.

Hay, in the West, is one of the most expensive of the stock foods raised in all that great region known as the corn belt. In the more central portions of the corn zone, a ton of corn and fodder can be produced for less money than a ton of the best meadow hay. Hence, feeders use as largely of corn as possible, and when finishing off cattle fat, it is given almost exclusively, or with only enough rough fodder to properly divide it. Regularity in the amount of the ration fed is of particular importance. All animals should be fed at exactly regular hours, and just what they will eat clean. If any is left, it should be removed and given to other hungrier animals. As to the time of feeding, three times a day is sufficient for all except horses and swine. In fattening swine the best results are obtained by giving them what they will eat clean four times a day. There will always be some animals that will be delicate and indifferent feeders. These should always be separated from the hearty ones and given special care and food. Get rid of them at the first possible opportunity ; certainly as soon as they are in passably salable condition. There is no money either in trying to raise or fatten such.

When cattle are kept in a stable there should be a room, frost proof, where the morning's food may be prepared over night, if mixed food or wet food is given. If meal or other grain food is given without mixing with hay or straw—and in our opinion this is better for cattle—it should be given only moist enough so it will not be dry. A little experience will soon enable the feeder to so prepare the meal for the whole stock over night, that it will be in proper condition in the morning. If it be mixed with cut food, use clear bright oat straw if possible, and not cut shorter than two inches.

XVIII. Out-Door Feeding where Corn is Cheap.

In the milder latitudes of the West it has been found economical to feed in the open air where the shelter of timber or artificial plantings may be had. Careful experiments made some years since at the Illinois Industrial University, as between feeding in stables with ground and unground corn, showed a decided profit in the latter way of feeding. This we have also found to be the case. Under this system of feeding, whether the stock are fed snapped corn, or fed with husked corn, very little is lost.

The cattle are fed plentifully. What they leave and that which passes undigested is picked up by swine, two hogs being usually allowed to each steer to be fattened, and at the end of the day the hogs are given some corn additional, if they need it. Thus, except in very inclement weather, steers may be made fat on about fifty bushels of corn in about three to four months' feeding, and the shoats require but little additional food to bring them up to heavy weights.

The best plan we have ever tried for out-door fattening is to feed corn cut at the roots and shocked. This is hauled daily on truck wagons, when the ground is hard, or on sleds when there is snow, and fed, corn and fodder together. The cattle are not expected to eat the fodder clean, but usually they may be expected to consume the blades, which with the ears are the valuable part. The feeding is twice a day, in feeding lots—a lot for the morning feed and one for the evening feed. The cattle being about done with the ears, hogs are turned in to glean the scattered corn and droppings. Thus, whatever the system of feeding, if cattle have shelter from stormy and inclement weather, they may be made very fat, and healthfully so, and, where labor is scarce and corn cheap, at a minimum expense.

XIX. A Good Condiment.

We do not believe in condimental food for animals as a rule, but when it is deemed necessary, the following will be found to be a good condiment for special feeding, to be given one pound with each feed of meal: Twenty-five pounds ground linseed oil cake, ten pounds ground flaxseed, forty pounds corn-meal, twenty-four ounces ground turmeric root, two ounces ginger, two ounces caraway seed, eight ounces gentian, two ounces cream of tartar, one pound sulphur, one pound common salt and ten ounces coriander seed. Mix the whole together, and when fed use a quarter of a pound of molasses to each feed, the molasses to be used in the water for wetting the food in which the condiment is given. Where sorghum molasses is made, this will not be found to be expensive.

XX. So-Called Perfect Foods.

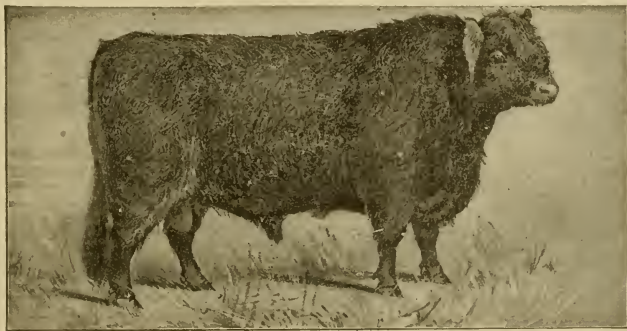
So much has been said by theorists about perfect foods, and the danger from feeding corn, that many persons have been brought to believe that corn is almost a dangerous food for growing animals; that thus fed, they will lack bone and muscle, and cannot be expected to grow up healthy. If an animal were to be raised exclusively on corn this might be true, but the same would be true of other grain. Neither horses, cattle, nor sheep can be properly raised exclusively on grain. Oats are

undoubtedly the best grain that can be fed to growing stock in connection with hay. Oats, however, cannot be afforded. Good hay is a perfect food, so far as the distension of the stomach is concerned. The animal cannot eat enough to fatten upon. Our pastures make a perfect food, so far as muscular development is concerned. For cattle, whole



LIMOUSINE BEEF CATTLE—(FRENCH).

These cattle are small, fine-boned, and greatly esteemed for their beef. The largest oxen will weigh about 2200 pounds, and a pair like these will bring \$240 to \$280.



A GALLOWAY BULL.

An observant gentleman who has traveled much, declares that well-bred animals possess national characteristics as distinctly marked as the different races of men. And there is much truth in his statement. Any one could tell at a glance that this rugged and good-natured little bull was a native of the famous Emerald Isle.

corn, that is, ears, husks, and leaves, forms a perfect food either for growing or fattening stock in winter, so soon as they get strength of jaw sufficient to crush the corn. Therefore, no breeder need be afraid that cattle from calfhood up will fail to develop, with plenty of good hay and corn, or corn-meal in winter, and plenty of good, flush pasture in summer, with pure water at all times.

CHAPTER XIV.

PASTURAGE AND FEEDING FOR PROFIT.

I. STUDY THE CONDITIONS.—II. PROVIDE AGAINST DROUGHTS.—III. KINDS OF FEED TO RAISE.—IV. PASTURE THE POOR MAN'S WEALTH.—V. THE VALUABLE CLOVERS.—VI. ALFALFA OR LUZERNE.—VII. CLOVERS NOT GENERALLY VALUABLE.—VIII. FORAGE AND FEEDING PLANTS.—IX. GRASS IS THE MOST VALUABLE.—X. GRASSES OF SPECIAL VALUE.—XI. THE COMING GRASSES FOR THE WEST.—XII. THE TIME TO PASTURE.—XIII. FEEDING IN WINTER.—XIV. WATERING.—XV. FEEDING IN SUMMER.—XVI. ECONOMY OF FULL SUMMER AND WINTER FEEDING.—XVII. SUMMING UP.—XVIII. FINISHING A STEER.—XIX. WHEN TO SELL.

I. Study the Conditions.

In every country, and, indeed, in every district of a country, the circumstances attending the rearing, and especially the feeding and fattening of stock are so varying and diversified, that the aggregate cost of a comparatively insignificant group of items is what makes the difference between profit and loss in feeding. For instance, a few cents a bushel more or less in the price of corn, an extra month of winter, or greater cost of watering in one case than in another may give one man profit and another man it may carry into loss. Insufficient shelter, imperfect conveniences and little wastes, here and there will often turn the scale both in summer and in winter feeding.

II. Provide against Droughts.

In summer, a drought which finds the feeder unprepared with green food, other than grass, will destroy profits, as also will a failure of water. The reason is simple. Every case of this kind which stops or retards fattening, is not only a loss through the shrinkage of flesh, but after the animals again begin to improve, it takes some time before they really begin to thrive again when the pastures become flush. Not so with the farmer who provides against a lack of water during droughts, and has sufficient green fodder to supply deficiencies arising from bare or partly bare pastures.

III. Kinds of Feed to Raise.

The question of feeding-material is an important one, and here the feeder must be guided by soil, climate and such other natural contingencies as he may have to encounter. Any fodder crop does best on a rather

porous but rich soil. Hence, if the soil is stiff, it may be opened by plowing under long manure deeply. If already too light, give it cow manure, ashes, and such special manures as you may be in the habit of using.

Corn is the great soiling crop for farm animals North and South. Next come sorghum, and the many varieties of Doura corn or East Indian millet. In the South, cow-peas are valuable. Alfalfa, once it is established, gives heavy cuttings of fodder. In the North this plant has not, as a rule, proved valuable, but some varieties of the cow-pea can be grown and matured in from seven to eight weeks. It is worthy of experiment. Sown after the nights become warm, this crop is a most valuable one to turn under as a fertilizer if not wanted for feeding.

With proper care in seeding thick on rich soil, any forage crop may be cut with a mowing machine, so that the labor of gathering is comparatively light, and it may be fed occasionally in the field or in the yards, night and morning, or only at night, as circumstances may dictate.

It must be remembered as a first principle in feeding, whether for growth or for fattening, that animals must not be allowed to shrink, since every time they do so it is at a loss of flesh to themselves and of profit to the owner.

IV. Pasture the Poor Man's Wealth.

Upon plenty of good pasture depends success in summer feeding: with the majority of farmers the pasture provides the sole summer feed. Hence the necessity that it be strong and vigorous. Nothing is gained by overstocking a pasture. It is better to get rid of some of the stock than to feed the pasture too close, for animals that have to busy themselves all day to satisfy the cravings of their stomachs never come out fat. If you have provided for contingencies, by means of fodder, you may, of course, stock your pastures closer than otherwise. If not, stock them only so the cattle can easily supply their wants.

V. The Valuable Clovers.

The best clovers, or those which do well generally, are practically included in three species, viz: The Red clover, the White or Dutch clover, and the Alsike clover. The soils best adapted to Red clover are such as will bring good crops of winter grain, though Red clover does well on all soils which do not heave badly in winter.

White clover will grow on any land adapted to Blue grass, and also on many rather moist soils. It favors a firm, not a spongy soil. It must be confessed that cattle do not like it, but it makes rich feed, and if mixed with Blue grass, or other soft grass, cattle will take both together.

Alsike clover—often called Swedish clover—does well on most soils, and will bear considerable flooding, if the flooding is not too long continued. We consider it as altogether superior to White clover for pasture, and on soils too wet for Red clover it makes good hay for cattle.

VI. Alfalfa or Luzerne.

Alfalfa or Luzerne—its true name—is a valuable barn forage; it should be cut and fed fresh or partly wilted. It thrives on deep, dry soils, which are not subject to hard freezing in winter. It has become thoroughly naturalized in California, does exceedingly well on the Western plains in Texas and in New Mexico, as it has done in some of the Southern States east of the Mississippi. It is no longer an experiment.

VII. Clovers Not Generally Valuable.

What we have previously written under this head, we have since seen no reason to change. There are many other species of clovers, some of them indigenous to the West, which we only mention as a caution against their being sown. These two species of so called Buffalo clover—the upright and the running Buffalo clovers—the upright or yellow clover, and the low hop clover, a half-creeping variety. There is only one more variety worth mentioning, and this simply as a warning to farmers not to sow it, except for bee pasturage, and then only when it may not become a troublesome weed. We have reference to the tree clover or Bokhara clover, specifically the white-flowered *melliotus*. It has been recommended as valuable for soiling, that is, for cutting green for feeding to stock in stables. We give the same advice about sowing this clover that the crabbed lawyer did to a young client who asked his advice about getting married—*Don't*.

If there are bee men near, your hedge rows and waste places will be well seeded with this Bokhara clover. At least such seems to be the case, much to the disgust of the general farming community. It does make good bee pasture—no doubt of it—but it is a nuisance in every other respect.

VIII. Forage and Feeding Plants.

We have already spoken of the value of forage plants, and, in a preceding chapter of root crops. Turnips, rape and mustard, so valuable in England and some other parts of Europe, belong to what botanists call cruciferous plants. The ruta-baga, the kohl-rabi and the cabbage are the principal plants of this tribe that are valuable to the farmers in the United States; and, in the West, these are not especially valuable for feeding. Of the other special fruit and root crops, the gourd family includes

pumpkins and squashes, which find a large place in feeding stock in many portions of the United States. The composite family, the largest of the natural families, furnishes artichokes and a few others seldom used; but it is remarkable in its lack of useful species although wonderful in ornamental ones. The night-shade family gives us the potato. The parsley family gives us the carrot, the parsnip and some others of value, and the goosefoot family furnishes the sugar beet and mangelwurzel, valuable for feeding in the West.

IX. Grass is the Most Valuable.

All these plants placed together are of minor account in comparison with the great grass family, which includes our cereal grains.

We do not use botanical names usually in speaking of grasses. We only introduce them below in connection with the common names, because in some cases the same grass goes by different names in different parts of the country. The feeder may select from the following list:

Timothy, (*Phleum pratense*) a better name for which would be Cat's-tail grass, and, for the reason that in some sections of the country it is called Timothy, as in Pennsylvania, and Herd's grass in New England and New York. Neither of these names gives an indication of its characteristic flower-head, while the former names do. In Blue grass, (*Poa pratensis*); Wire grass, (*Poa compressa*); Red-top, (*Agrostis vulgaris*) confusion of names again comes in. In Pennsylvania, Blue grass is called Green grass, and Red-top is called Herd's grass. Orchard grass, (*Dactylis glomerata*); Fowl-meadow grass, (*Poa serotina*), and Meadow fescue, (*Festuca pratensis*), are also most valuable grasses.

X. Grasses of Special Value.

For feeding during droughts, Indian corn, sown at the rate of two bushels per acre, in drills two feet apart, cultivated thoroughly once or twice, and cut when in blossom will make a good reliance, as also will German millet (*Panicum Germanicum*), and common millet (*P. miliaceum*). Here we have nine varieties of grass that do well generally.

The first, second, third and fourth, with the clovers heretofore named, constitute the bulk of the grasses cultivated for pasture. Orchard grass is one of the most valuable in the whole list, and should be tried everywhere, on land not wet. Fowl-meadow is also well worthy of trial. Fowl-meadow grass especially has been found to take the place of Blue grass in those sections of the Northwest where Blue grass does not succeed. Especially has this been the case in Wisconsin. It is hoped it may be found so in the Southwest, where Blue grass is not natural to the soil.

XI. The Coming Grasses for the West.

We believe Orchard grass and Fowl-meadow will be found to be two of the most valuable grasses for the West, the Northwest, and perhaps for the Southwest, when they come to be better known. Orchard grass, also, gives good satisfaction in the middle region of the South, and we think that Fowl-meadow will also prove most valuable there. Mr. Frank E. Hoyt, a careful farmer of Wisconsin, in relation to this grass, says he knows of no grass in the Northwest that will compare with it, either for pasturage or the production of hay. It has never been winter or summer killed, and he has found one acre of marsh well set in Fowl-meadow equal for pasturage to three acres of upland, set in Blue grass, and the hay produced the second year after seeding has never failed to pay the entire expense of cultivating and seeding the land. Fowl-meadow hay is especially valuable for horses, having all the advantages of wild hay, being free from dust, that infests timothy and clover, while it possesses all the nutriment of the best tame hay; and those dairymen who are acquainted with it, pronounce it valuable hay for milch cows.

XII. Time to Pasture.

The time to pasture is when the dew is on, the earlier in the morning the better. Our plan has always been to allow cattle to lie in the pasture all night; and this rule is good even in the spring and fall, if shelter is provided against cold storms, and the pasture is not too remote from the house. In that case the milch cows must lie in the yard, but should have some food they like, early in the morning, unless milked at day-break.

XIII. Feeding in Winter.

Whatever the stock, or the place of feeding, give the first meal as soon after day-light as possible in winter—just what they will fully eat. If eaten pretty clean, give a little more feed again at noon, and again at night, so that the animals may lie down on fairly full stomachs before dark. If only one feed of grain is given daily, it should be given at night.

Stock should be graded in the feeding yard as to age and strength. The weak and the strong should never be fed together, else the strong will get better feeding than the weak ones, even when the fullest allowance is given. Special attention should be paid to the allowance of salt. Cattle should have it where they can take it at will. They will consume less than if it be given them at regular intervals. Salt taken in large doses is cathartic, but in such quantities as animals naturally crave daily it aids digestion and is necessary to all herbivorous animals.

In feeding in stables observe the same rule—full feeding of good provender, early and late and at noon. This is what keeps animals growing continuously and insures profits; for thus the feeder secures the greatest possible gain, with the least loss, to the animal system.

It is poor policy, when grain is cheaper than hay—and it is so in many portions of the West—to feed largely with hay. Corn and good bright straw, with, say, five pounds of good hay daily per steer will keep them growing right along. Dry corn with little fodder tends to unnatural heat and fever. Therefore keep the stomach distended with a proper quantity of fodder of some kind, and if the corn can be fed after being soaked so much the better.

XIV. Watering.

Cattle should have water offered them twice a day in winter, and in summer it is desirable that they get it whenever they happen to want it. People sometimes need but little water and at other times a great deal. It is the same with stock of all kinds. If the water is in pools, do not cut holes in the ice for stock to drink through, unless precautions have been taken to prevent their slipping on the ice. This hint may seem needless; and yet, there is more loss on stock, every year, from this cause, than would provide suitable pumps and troughs, and also pay for the labor of pumping.

XV. Feeding in Summer.

In fattening cattle it often happens that the grass is not sufficient, or if it be sufficient to keep them full, they do not fatten fast enough. It is just as cheap for the farmer who only fattens a few head yearly to make prime cattle, as it is for one who fattens hundreds. In fact a man who fattens but a few head should make better cattle than one who feeds many.

In England when grain is high, the most of it being imported, summer feeding of grain with grass has been practiced for years. Why should it not be so here in the West, where the grain is grown that the English feeders buy? The pastures during July and August will not graze as many head of cattle as in spring and autumn. Hence, the English farmers can fully stock their pastures by supplying what meal the cattle will eat while the grass is scant. When pastures are flush and in full succulence but little if any of the meal will be taken. What meal they do eat is so much clear gain in fattening. Animals, when on succulent pasture, require some dry food. They will even eat a little hay daily at such times. Thus meal, or if the cattle are used to it, soaked corn, not only modifies the succulence of green grass and clover, which contains

from eighty to eighty-five per cent. of water, but it promotes the growth of young cattle, and brings well-matured steers fully fat at midsummer, and at other seasons when prime beef brings the best prices.

XVI. Economy of Full Summer and Winter Feeding.

From what has been written the reader will have become convinced that we believe in the economy of full summer and winter feeding, and this from calfhood up until the animal is sold to the butcher. The same rule will apply to stock intended for breeding and also to cows raised for their milk product. In the two latter cases, however, the feeding must be more diversified; for breeding and milking animals need to have fully-developed frames. This is not so necessary for stock that is to be sold as soon as fit for the butcher. We have shown that three years from birth is ample time in which to prepare cattle for the butcher's block. The principal economy in feeding grain to fattening animals the year round is, that thereby your pastures may be more fully stocked than otherwise, and thus may be fed more evenly. By this course, also, you will have more land left for the production of corn for winter feeding. We have cultivated over sixty acres of corn to the hand in a field of 1,500 acres, the outlay being only one-third of a day's work per man per acre up to, but not including, the labor of husking. The average yield was within a fraction of forty bushels per acre for the whole area, and the final result was of corn put into the crib, over seventeen bushels for every day's work of each hand employed. The same may be done by any farmer on measurably clean land in any season.

The first proposition in relation to full feeding, winter and summer, is, that your pastures will thereby carry more cattle. The second is, that animals, going into winter quarters fat, will waste less flesh during the winter, since the animal heat is more easily kept up in a fat than in a half-fat or lean one. The third and not the least important point is, that you hasten maturity and thus save interest on capital, insurance, and other items of cost.

XVII. Summing Up.

The whole matter may be summed up as follows: The pasture grasses mixed make a perfect food. Therefore make the most of them. Clover Timothy, Red-top, Orchard grass, and Fowl-meadow grass also make a perfect food. When they can be economically raised (and where in a grass country can they not?) make the most of them. Raise all the roots you can, (in the West carrots and beets) to supplement your grasses with. But do not expect to fatten stock without grain. It cannot be done unless extra warmth is provided, and this is not economical. Never

attempt to fatten stock of any kind without due attention to comfortable shelter. For this, expensive structures are not necessary. We have fattened cattle in a structure of posts and poles covered with hay and embanked at the sides, and with no flooring but the natural earth, but with a thick bedding of straw. Yet, if the means of the farmer will allow, a good frame structure will pay, simply in the lessened cost of labor in care, feeding and cleaning. Once you begin to fatten, never allow the stock to lose, but keep them going right along, and increase the richness of the food as the animal progresses to ripeness.

Hay will bring a steer into tolerable condition for fattening. Then he will stop. Good pasture will carry him still farther. He will make good, succulent, healthy beef, but cannot be made fully fat on grass. Hence, he must at least be finished off with grain. Indeed, to make him "ripe" (fully fat) meal and even oil-cake must be used.

XVIII. Finishing a Steer.

If the steer has been liberally fed from a calf, he will be ready to begin fattening the spring he is three or four years old, according to the breed—if a Short-Horn or Hereford, at two years old perhaps. Turn him on pasture and add what soaked corn or meal he will eat; give him shelter from the heat and flies. If the aftermath is good add pumpkins, or corn in the husk, as soon as it begins to glaze; and continue increasing the corn as the grass fails.

Do not let your steers suffer for want of shelter from storms, and when the grass gives out put them in a warm stable, and finish them with meal, or meal and oil-cake, allowing of the best hay not over ten pounds a day, with a peck, daily, of roots or the equivalent in pumpkins, as long as they last. If the steers are to be continued in the fields—where the climate and shelter will admit—feed shocked corn, and let store cattle and hogs consume the leavings. Thus you may always have them in condition to sell when the price suits.

XIX. When to Sell.

Sell in the fall or early winter if the demand will warrant it. If not, keep the steers until the price coincides with your views. Your books should tell you just how much your cattle have cost, and just what the profits would be at any time, if you weigh them on your home scales, or those nearest you; you will have cattle that buyers will always come to you for in either case. And if they are stall-fed—as we have shown how to stall-feed—they will always bring the price of fancy beef; and two to three cents advance over the price of half-fattened beef is just where the profit of feeding lies.

CHAPTER XV.

DAIRYING AND BUTTER MAKING—DAIRY BUILDINGS.

I. CAUSES OF CHANGES IN MILK.—II. MILKING THE COW.—III. THE BARN.—IV. MILK UTENSILS AND THEIR CARE.—V. HANDLING OF MILK AFTER IT IS DRAWN.—VI. THE CREAM SEPARATOR AND ITS OPERATION.—VII. SEPARATING THE MILK.—VIII. RIPENING THE CREAM.—IX. THE CHURN.—X. CHURNING.—XI. WORKING THE BUTTER.—XII. CARE OF UTENSILS.

The principles of making butter are easily understood. When studied from the standpoint of present knowledge, most of the mystery that formerly surrounded the work of the butter maker disappears. The making of good butter is not a system of "rule of thumb," but certain well-defined laws can be laid down, which, if followed, will insure success.

On the farm the maker has control of every step in the process of making butter. Beginning with the supposition that the cows are normal and healthy, he starts with one ideal condition, namely, a source of pure milk. As the milk is drawn from the udder it should be free from any element that would cause its decomposition, but the fact that it will in a few hours become sour or show evidence that other changes have taken place proves that a foreign element is present to produce these changes. A study of these changes and their cause is the first and most important lesson for the butter maker.

I. Cause of Changes in Milk.

Everyone is familiar with the changes that often take place in milk and those which occur in the spoiling of fresh meats and vegetables, though the causes that produce these changes may not be apparent to the observer. It is also a matter of common experience that in hot moist weather these changes take place with much greater rapidity than in cold or dry weather. Everyone who has handled milk has learned that cleanliness in everything that comes in contact with it is one of the essential factors to success. Cold storage, such as may be supplied by the common household refrigerator, is also necessary for the keeping of milk and other perishable products in hot weather.

The cause of the spoiling of fruit, vegetables, meats, and milk was found to be minute plant life, or germs, called bacteria. It was discovered that these minute forms of life—so small that it takes a powerful magnifying glass to see them—were the cause of all decomposition. A study of their life, habits of growth, the food on which they lived, the kind of substance on which they could develop, and the temperatures most favorable to their growth revealed the scientific necessity for observing perfect cleanliness in all dairy utensils and for keeping the milk cold. It was found that bacterial life is in evidence everywhere, and only awaits the proper food, moisture, and warmth to cause the bacteria to multiply very rapidly. Just as a grain of corn grows when given proper moisture and warmth, so the germ life that finds its way into milk utilizes the food and warmth found there to grow and multiply, causing decomposition.

It has been found that when milk or other perishable foods are kept free from bacteria they will not spoil; and, further, that foods of this nature when kept at low temperatures are very much longer in spoiling, although they may contain great numbers of germs. When milk and other products are heated to a high temperature the bacterial life is destroyed, and the products will keep for a long time if no additional bacteria gain access to them.

II. Milking the Cow.

Things for Milkers to Think About.—Too many milkers regard the work of milking as a dirty, disagreeable task. The work has resolved itself into nothing more than the manipulation of the udder, and is to be hurried through with as quickly as possible. The element that takes from all drudgery its unpleasantness is wanting. That element is thinking along lines tending to improve the work. In the processes that attend the milking of a cow there is enough to cause the milker to study seriously the work that leads up to the making of a perfect pound of butter. Milk as it is drawn from the udder is nearly free from bacteria. Could it be kept in this condition it would keep for many hours before any perceptible change would take place.

The first bacteria enter during the time of milking and are naturally from the cow and her surroundings. The manipulation of the udder works off hair, particles of skin, and in many instances particles of manure that adhere to the hair and udder. All of this material finds its way into the milk pail and carries with it great numbers of bacteria. The warm temperature and the presence of a congenial food supply that is in just the right physical condition cause these bacteria to multiply very rapidly, and unless something is done to check their growth souring or other evidence of decomposition will take place in a few hours. The rapidity with which these changes occur will depend almost entirely upon the temperature at which the milk is allowed to stand and the number of bacteria that find entrance to it. These facts are constantly in the mind of the careful dairyman. He knows that the first step is that of prevention. The work of milking should be performed in such a way that few bacteria will find their way into the milk. The milk should be cooled quickly and thoroughly immediately after it is drawn, in order to check the growth of those bacteria that will, under the best conditions, find their way into it.

Cleaning the Cow.—All this leads to the conclusion that the cow must be carefully cleaned. This is as good for her general physical well-being as for the protection and purity of the milk. The card or the currycomb thoroughly but gently applied will remove all coarse dirt, straw, or other matter clinging to the animal that would eventually find its way into the pail. Aside from carefully cleaning the cow with the card or currycomb, the parts immediately surrounding the udder and the udder itself should be wiped with a damp cloth. This had best be done just before the milking begins, as it will remove most of the dust which may still remain after carding and dampen that which is not removed, so that it will not fall into the milk pail. If the milking is to be done in the barn there are some

other important things that need attention. The air in the milking place must be free from dust—it matters not whether the dust comes from the floor as a result of its recent cleaning, or whether the animals have stirred up the dust in coming into the stalls, or whether it is caused by the distribution of feed in the racks and boxes. Dust in the air will find its way into the milk, bringing with it great numbers of bacteria. If the floors are dusty they should be lightly sprinkled, so as to prevent the stirring of the dust. Feed should not be distributed just before or during the milking hour.

Clean Milkers.—Another thing of importance in connection with milking is the condition of the hands and clothes of the milker. He should be clean personally, and should be required to go about his work in clean clothes. The milking should be done with dry hands. The habit of some milkers of wetting their hands with milk just as they begin is a filthy practice and the cause of much bad milk and poor butter. There is something in the presence of a milker in a white suit that calls for clean work, particularly if he is required to keep the suit clean while about his work. For this reason, as well as for the esthetic effect, many dairymen require their milkers to be dressed in white. The same principle is true in regard to whitewash on the interior of the barn. A carefully white-washed wall shows off cobwebs to their disadvantage, and they will usually be removed. There is something out of place if part of a building is kept clean and fresh—as a whitewashed wall, for instance—and other parts are a mire of filth. Whitewashed walls go with clean floors, and the two with a white-clad milker will usually insure clean milk.

III. The Barn.

Construction and Care.—It will be seen from the preceding paragraph that the barn and its care have an important influence in the production of pure milk. As it is impossible to secure pure milk in a dirty dark barn reeking with odors of manure, its construction must be taken into account. Plenty of air space must be provided in order to insure pure air, from 900 to 1,000 cubic feet being needed for each animal. An abundance of window space must be provided. Enough light should enter to enable one to read a newspaper in the darkest places. The ventilation should be such that the air is changed every few minutes. Anyone contemplating a new barn or a reconstruction of an old barn to conform with the ideas here mentioned should secure some good treatise on barn construction and ventilation. It is evident to any observer that one of the difficulties in securing good milk is the dark, poorly ventilated and constructed barns, containing rotten wooden floors that can not be cleaned. Concrete is the best material for floors. It is economical and can be easily kept clean. If wood is used in floor construction, it should be closely laid in pitch and kept in perfect repair. The interior of the barn should be kept well covered with whitewash, which acts as a purifier and makes the rooms much lighter. Stalls and feed boxes should be simple in construction and easily cleaned.

IV. Milk Utensils and Their Care.

Character of Utensils.—Not all of the bacteria that find their way into milk come from the cow or the barn. Often milk pails, strainers, cans, and other utensils used for handling milk are the source of such trouble. Faulty construction of these vessels is very common. There should be no hidden, inaccessible places in milk vessels. The seams should be soldered over smoothly, inside and out. Cheap tinware is not usually well soldered, and if such is purchased it should be taken to the tinner to have all seams carefully gone over, closing up all that are open and can not easily be cleaned. Galvanized iron is sometimes used for milk pails and other dairy vessels, but it should not be, as the galvanizing is rough on the surface and affords hiding places for innumerable bacteria. Wooden vessels should not be tolerated, under any condition, for holding milk, for it is impossible to keep them clean. Rusty tinware, besides its effect in imparting rusty or metallic flavor to the milk, is objectionable for the same reason. Good tin is the only practicable material for milk vessels, and this must be kept shining and bright.

Cleaning the Utensils.—The proper washing of milk utensils is something that is often misunderstood. All milk should be rinsed from the surface of the tin before it comes in contact with boiling water, as the heat will cook the milk onto the surface, forming a coating very difficult to remove. If this coating is not removed, it furnishes food and place for bacterial growth. This is especially true around places liable to remain moist. After rinsing the vessel free from milk, it may then be washed in hot water. There should be added to the water some good cleansing compound. Some of the so-called washing powders are very objectionable, as grease of some kind is used principally in their make-up. When such powders are used a coating of thick grease will be formed around the edges of the sink or pan containing the wash water. All such compounds should be discarded. Powders can be procured that are guaranteed to contain no grease, and they are usually excellent cleansers. If these are not obtainable, the best thing to use is ordinary commercial sal soda and a little borax, which are cheap and effective.

For scrubbing the surfaces of milk vessels a good brush should be used. There is nothing more objectionable for this purpose than a cloth, particularly the cloth that has been used for washing the dinner dishes, or the pots and pans. A good hand brush can be purchased for a few cents. It is the most effective and can easily be kept clean.

Drying and Sunning Utensils.—The final rinsing of dairy vessels should be in boiling hot water. If they are allowed to remain a few minutes in the hot water, all the better. The heat will reach every part, and be continued long enough to destroy all bacterial life. After the rinsing in boiling water, the surface will quickly dry and should be allowed to do so naturally. Turn the vessel so that it will drain, and in a few moments the heat in the metal will dry the surface. A cloth for drying can rarely be kept clean, and for this reason does more harm than good. It is an

excellent practice to stand the pails and other milk vessels in the sun so that the rays will reach every part of the inside. Most species of bacteria can not live in the direct rays of the sun. For this reason milk rooms and similar rooms for handling milk products, except cold-storage rooms, should be built so that the sunlight can enter in abundance. Dairy rooms are usually damp, and if dark will permit the growth of molds and the development of bacteria, and will speedily become unfit as places to keep milk. The troubles with stringy, or ropy, milk usually occur in places of this kind, and can be overcome by a thorough cleansing and the admission of plenty of air and sunlight.

V. Handling of Milk After It Is Drawn.

Milk is often spoiled by allowing it to stand in the barn too long after it is drawn. It readily absorbs odors from the air, and odors of the barn are usually very much in evidence. For this reason the milk should be quickly removed to a place free from odors.

The Milk Room.—If milk is placed in a cellar or cave where there are decaying vegetables or fruits it will quickly absorb the odors from them. Such places are entirely unfit for the storing of milk. The dairyman should have a building set apart from the barns or other places from which objectionable odors might come, for the exclusive use of the dairy. This building need not be very large, but must be constructed so that it can be easily kept clean and cool. A cement floor should be laid, as it is the easiest to clean, is cool, and does not rot from moisture. If the walls are built of stone, brick, or concrete, so much the better, for such walls keep out the heat.

The roof construction should be such that it will effectually turn the heat of the sun. If the roof is not of concrete, it should be built double so that an air current will pass between the upper and lower part. Walls and ceilings should be covered with cement plaster, whether wood or stone is used in their construction. This finish, if properly put on, is easy to clean and does not readily become affected with mold or decay.

The Water Supply.—Provision must be made for an abundance of water and the pumping arrangement must be such that the fresh water from the well or spring will flow through the dairy house. It should run into a tank built deep enough to allow the complete submerging of the milk and cream cans. The tank should have sufficient width and length to hold all that it may be necessary to use. A tank built up of concrete and finished with a cement surface is the most economical in the long run and is much more satisfactory. Provision must be made for draining it out for purposes of cleaning. Wooden tanks are usually a source of trouble from leaks and decay. Iron tanks do not last long, because they become rusty.

Cooling Arrangements.—If the dairyman has ice, the problem of cooling is very simple. Broken ice can be placed in the tank about the cans. There are plans for building ice houses with refrigerators connected, but,

all purposes considered, the refrigerator can be built with most economy and with better sanitary arrangement if it is constructed separate from the ice house. The common ice chest in which the products to be cooled are placed in the box with the ice is a very satisfactory way for handling cans of milk or cream. For other products it is not so satisfactory, as it is not dry enough, and if the articles are small does not afford shelf room for them.

Use of Steam.—In a moderate-sized dairy there should be added to the equipment a small steam boiler which should be in a room separate from the dairy. There is always need of steam, and the additional cost involved is but little compared with the benefits obtained. If steam can not be provided, a small hot-water heater of some kind should be used. It is essential to have plenty of boiling water for purposes of washing and scalding milk vessels and the floors and walls of the building.

It is not within the province of this bulletin to go into details of construction in the matter of dairy buildings. The ideas here given are general in nature and involve principles that should be followed in any construction.

VI. The Cream Separator and Its Operation.

Advantages of Mechanical Separation.—There are two general methods in practice for creaming the milk. One is to place the milk in shallow pans or deep cans and allow the cream to rise by gravity. The other is the use of the centrifugal separator. As the separator is fast displacing the old method, space will be given here for a discussion of separation by centrifugal force only.

The dairyman can not afford to be without a separator. It removes practically all of the butter fat from the milk, while the old method of gravity skimming will leave from one-eighth to one-fourth of the butter fat in the milk. The cream from the centrifugal machine is of finer quality, and a much better product can be made from it. The skim milk is fresh and sweet for feeding and is far superior to that from the gravity system.

There are numerous kinds of mechanical separators on the market, but they differ in details of construction rather than in the principles on which they work. The dairyman should thoroughly understand these principles. In selecting a separator one should first determine its value for good work, and then examine its mechanical construction to see if it will stand long use.

The Principles of Separation.—The force that is used to separate the milk is known as centrifugal force. This force may be described as the pull that is felt when a weight attached to a string is whirled about the hand. It is the pull outward, and the faster the weight is whirled the stronger the pull becomes. In the old system of creaming, the separation is caused by the action of gravity. The fat globules, being lighter than the other portions of the milk, are forced to the top; that is, gravity acts stronger or pulls harder on the heavier portions than it does on the lighter,

and the milk is gradually arranged in layers, the lighter portion at the top and the heavier portion at the bottom. The force acting in the separator has precisely the same action on the milk, but acts outward from the center of the bowl the same as gravity acts downward from the surface, only many thousand times stronger, accomplishing in a few moments and far more completely what it takes gravity several hours to do.

As the milk goes into the bowl it is at once thrown to the outermost parts and fills the bowl completely until an opening is reached where it will flow out again. The surface of the milk is on a line parallel with the center, or axis, of the bowl, and is exactly in line with the cream outlet. A cross section through the bowl from this surface to the outside presents much the same appearance as would a pan of milk after the cream has raised by gravity. The cream is on the surface, which might be called the top, and the heavier portions of the milk at the point farthest from the center, which would represent the bottom.

With this understanding of the arrangement of the milk in the bowl there are a number of things to be observed which influence the separation. The difference in length of time it takes to separate cream by gravity and by centrifugal force shows plainly that the time varies with the amount of force applied. The shorter the time the greater the force must be. Skim milk from the separator contains less fat than that secured by the gravity system, showing that the greater force causes more perfect separation.

From the above statements the following conclusions regarding the uses of the separator may be drawn: (1) If the amount of milk that passes through the separator in a given time is a fixed quantity, any increase in the speed of the machine will tend to cause closer skimming because of the greater force exerted; (2) if the amount of milk that passes through in a given time is increased and the speed remains the same the skimming will not be so perfect, for the centrifugal force is not exerted on the milk so long a time. It is evident, therefore, that the closeness of skimming is the result of two factors—time and force. If either of these is decreased, the result will be poorer work. If either is increased, better work will result.

Common Errors in Operating Separators.—Two errors are made in operating separators because of ignorance of the facts just stated. The first consists in allowing too much milk to pass through the machine. As there is a limit to the practical speed at which the machine can be safely run, it is not good practice to try to overcome the error referred to by increasing the speed beyond the safe point. The feed outlet is usually fixed so that too much milk will not run through, but cases have been known where operators, anxious to shorten the time of separation, have enlarged the opening, allowing too much milk to pass. This error is not so common as the second, which is to allow the speed of the machine to become too slow. The slow speed does not generate enough force to skim properly, and the result is loss of butter fat in the skim milk. The number of revolutions per minute required by a machine is usually indicated on

the machine or in the instruction book belonging to it, and this should be strictly followed.

Best Temperature of Milk for Separating.—All liquids flow more readily when warm than cold. This is not as noticeable with milk as it may be with molasses, but the principle holds just as true and is readily shown in the separation of milk. Everyone has observed that cold cream does not flow as readily as warm cream. As cream is one of the products of separation and has to flow from the machine through a small opening or outlet, it is seen that the warmer it is the more readily it will flow. If the flow of cream is checked, more milk will be forced out of the skim-milk outlet, and if the obstruction to the flow becomes too great, butter fat will go out with the skim milk, because it can not move fast enough through the cream outlet. For this reason the nearer the temperature of the milk approaches the animal heat the better will be the separation. While some machines are supposed to skim milk as cold as 60° to 65° F., it is not good practice, because the skimming will not be so close. The milk should be at a temperature of 80° or higher. It will be seen, therefore, that a third factor, in addition to rate of feed and speed of machine—namely, the temperature of the milk—has a direct bearing on separation, and it may be accepted as true that the warmer the milk the better the work.

SUMMARY OF POINTS TO BE OBSERVED.—To summarize, the points in the operation of a separator, given in their order of importance as bearing on the quality of the work, are as follows:

First. The speed of the separator must be uniform and up to the standard required by the makers of that particular machine.

Second. The temperature of the milk should be such as will make it flow readily; the warmer it is the more perfect will be the separation.

Third. The amount of milk that is run through the machine should remain constant, and should not be increased over that which is intended for the machine.

Fourth. The machine should be set on a solid base or foundation, so that there will be no jar or shaking about as it is turned, such as would tend to interfere with the even flow of the milk through the bowl and thus destroy its efficiency in skimming.

Fifth. The separator must be kept thoroughly and scrupulously clean, particular care being taken that none of the tubes through which the milk flows become obstructed in any way.

Sixth. The test of the cream can be readily changed by changing either the cream outlet or the skim-milk outlet.

In the mechanical operation of a machine none but the best oil should be used, and this should not be allowed to gum or become dirty on the bearings. It is good practice to flush the bearings with kerosene occasionally by making a run with kerosene in the oil cups. This will serve

to cut out any gum or dust that has accumulated in the bearings and will make the machine run much freer and easier, thus greatly increasing the length of time that it will last and do perfect work.

VII. Separating the Milk.

The milk should be separated as soon as possible after milking, while it still contains the animal heat.

Use of Strainers.—If milk has been handled in a cleanly way during milking it can be poured directly into the supply can of the separator without straining. The dairyman who depends upon the strainer to clean the milk rather than using cleanly methods of milking is the one who makes the poorer butter. If it is necessary to strain the milk a very fine wire strainer should be used. It is very difficult to keep a cloth strainer in good condition, and if not kept in good condition it is a seed bed for trouble. When a strainer cloth becomes yellow it rarely ever smells clean, indicating that decomposition is going on and that it is not fit to use. For this reason it is best to discard strainer cloths entirely. If a strainer other than wire is used, it is best to employ some material such as absorbent cotton that can be thrown away at the end of each milking.

Operating the Machine.—Before starting the separator the operator should look carefully after the bearings or wearing parts, putting a drop or two of oil on each and noting whether the oil cups are dropping properly. Instructions for care and oiling come with each machine and they should be heeded. The makers have studied this problem and are bound for their own protection to give proper instructions for operation. In the winter time when the separator bowl and parts are cold it is best to pour a quart or so of hot water through the machine just as it is started. This warms up the surfaces and prevents the milk from sticking as it would if cold. It also makes the cleaning of the separator much easier and prevents its clogging up at the start.

Bring the machine gradually up to its normal speed and then turn the milk in slowly until the valve is wide open. Keep a constantly uniform motion of the handle during the entire run. When all of the milk has passed from the supply can a quart or so of the skim milk should be caught and poured through to flush out the cream that will remain in the bowl. Unless this is done some of the butter fat will adhere to the surface and a small amount remain in the center of the bowl, not being able to get out of the machine because there is no more milk flowing in to force it through. Pouring in the skim milk forces it all out. Warm water may be used for this purpose but usually it is not so convenient.

Care of Cream After Separation.—The first work on completion of the separation should be the care of the cream. It is the product for which all of the previous work has been performed and it is worse than folly to neglect it now it is secured. The cream must be cooled at once to check the growth of bacteria. The best method for doing this is to place it in a deep, narrow pail immersed in cold water just pumped from the well,

and then stir it gently until it is brought down to nearly the temperature of the water. A good dairy thermometer must be a part of the equipment of every dairy, and all temperatures should be taken with it—not by guess. It will take but a few minutes to cool the cream down in the manner described. As soon as it is cooled cover the pail in such a way that it can be entirely submerged in the water. The ordinary shotgun can, as it is commonly called, having a cover that fits over the outside coming down about two inches, with catches to hold it in place, is the best kind of a vessel for cooling and holding cream. When a can is entirely submerged it is protected from the heat of summer, the cold of winter, and the contaminating odors that may be in the air; and the surface is effectually kept from drying, leaving the cream in as fine physical condition as when separated.

Warm cream should never be mixed with cold. The result of mixing is always quick souring. The bacteria in the cold cream are dormant or inactive and will remain so if kept chilled. Just as soon as the temperature of the cream is raised a little it quickens the life of the bacteria and they increase at a rapid rate, causing souring in a very short time. Too much emphasis can not be given to the two points above mentioned—namely, the quick and thorough cooling immediately after separating and the caution in regard to the mixing of the warm and cold cream. It is of more importance to attend to the cream at once after the separating is finished than anything else at that particular time. The calves and pigs can wait for their skim milk, but bacteria in the cream wait for nothing until the temperature favorable to their growth is reduced.

In hot dry climates, where evaporation is excessive, another method for keeping milk or cream cool may be adopted. After the cream has been cooled as described, instead of submerging the can in a water tank it can be set out in the open under anything that will protect it from the sun. A pail of water should be set on the lid. A cloth stitched along the edges to form a sack must then be dipped in the water and slipped down over the pail and can, bringing it clear to the floor, with the upper end turned down into the water. This cloth or sack serves as a siphon and will gradually empty the pail, the water moving up the edge and down to the floor. From a cloth thus kept wet the evaporation will be very great, and the can and its contents under the cloth will be kept cool even in the hottest weather. In fact, the hotter and drier the air the greater the cooling effect, as there will be more rapid evaporation.

In using the tank for keeping cream cool, it must not be forgotten that the water must be kept fresh. If a constant stream is not running through the tank the water should be changed at least twice or three times during the day. The frequency should depend upon the coolness of the room in which the tank is kept.

Cleaning the Separator.—Very soon after the separation has been completed the separator should be cleaned. It is imperative that it be washed every time after it is used, and the sooner it is washed the easier will be the operation. The general directions for washing dairy tinware

apply to the parts of the separator that come in contact with the milk. In cleaning the machine the frame should not be neglected. Sometimes an operator thinks it is useless to spend time to keep it clean, as it does not come in direct contact with the milk. In most cases where a machine is found to be dirty and grimy, it will be found out of repair in other ways. The bearings will usually be gummy, and if examined the machine will be found to be out of level, and more often than otherwise the parts that come in contact with the milk will not have been properly cleaned.

VIII. Ripening the Cream.

Up to the point of ripening the cream the dairyman has been trying to keep his cream as free as possible from bacteria and to check the growth of all that may get into it, but from this point on the work will be quite different. Cream prepared as described in the foregoing paragraphs should be perfectly sweet, and if cooled properly will remain so for a number of hours. In fact it can be preserved four or five days if kept at a temperature below 50° F. It might be churned in this condition and a quality of butter made that is in demand in a limited way, but, practically speaking, all butter used in this country is churned from sour cream. Sweet-cream butter to most users tastes flat and insipid.

IX. The Churn.

Barrel Churn the Best.—Taking the barrel churn as best for the farm butter maker, he should know how to get the most out of it. In this form of churn the concussion of the cream necessary to do the churning is secured by the fall of the cream as the churn is revolved. The faster the churn is revolved the greater number of concussions per minute will be secured. But if the churn is whirled so fast that the centrifugal force created holds the cream from falling no churning will take place.

Cleaning the Churn.—Churns are usually made of wood, and their care is an important factor. When ready to clean, the churn should be rinsed out with cold water to remove all buttermilk, salt, etc.; it should then be partially filled with boiling water, the lid put on and fastened loosely, so steam can escape, the draining plug withdrawn, and the churn whirled. The pressure on the inside caused by the creation of steam from the hot water will force water into every nook and crevice of the churn. After a few revolutions the water should be drawn off and another lot, boiling hot, added, and the whirling repeated. Empty this out and let the churn stand so it will drain a few minutes, and then turn the opening up and let it dry. The heat in the wood will dry it out rapidly, and there will be no chance for mold to grow. An occasional rinsing out with lime water will help to keep a churn sweet.

All other wooden dairy utensils should be rinsed, scalded, and dried with the same care.

X. Churning.

The process of churning is the gathering into a mass of the butter fat in the cream. The butter fat exists in the cream in minute globules, each

independent of the others, and any agitation tends to bring them together, the force of the impact causing them to adhere to each other. As the agitation is continued these small particles of butter grow larger by addition of other particles until a stage is reached where they become visible to the eye, and if the churning is continued long enough all will be united in one lump of butter in the churn.

Temperature.—The time that it takes to churn depends largely on the temperature of the cream at the beginning. If the cream is quite warm, the butter will come very quickly; if it is too cold, the churning may have to be prolonged, in some instances for hours, before the butter granules will become large enough to free themselves from the buttermilk. The temperature at the beginning should be regulated accordingly. It is usually considered that about thirty to thirty-five minutes' churning should bring the butter. With different seasons of the year the temperatures will have to be varied somewhat in order to have the butter come in this length of time. It is necessary in hot weather to churn at a temperature as low as 50° or 55° F., while in the winter months, when the cows are on dry feed and the weather is cold, it is often necessary to raise the churning temperature to 60° or 65°. Cases have been known where under some peculiar feed condition the temperature had to be raised to as high as 80° F., in order to make the butter gather at all. Trouble of this kind rarely ever occurs when the cows have succulent feed in winter, such as silage or roots. Occasionally some peculiar fermentation takes place in the cream, causing difficult churning, but this is a result of carelessness somewhere, and can be remedied by a thorough cleaning up of the premises.

Washing and Salting the Butter.—It is important to know at just what point to stop churning. For best results in freeing the granules from the buttermilk and incorporating the salt it is considered that the butter granules should be about the size of beans or grains of corn, possibly a little larger. The churn is then stopped, and the buttermilk allowed to drain. After the buttermilk is well drained from the butter granules an amount of water about equal in volume and of the same temperature as the buttermilk should be added, and the churn given four or five revolutions, slowly, so that the water will come in contact with every particle of butter and wash out the remaining buttermilk.

As soon as the wash water has drained well from the butter granules, salt should be added. The amount of salt used will depend entirely on the demands of the consumer. Usually about one ounce of salt for each pound of butter will be necessary. If the ordinary barrel churn is used, which is perhaps the best form made, the salt may be added in the churn. By giving the churn a few revolutions the salt will be quite thoroughly incorporated with the butter. It should stand in this condition for a few minutes, until the salt becomes more or less dissolved, before the working of the butter is begun.

XI. Working the Butter.

Table Workers.—For working the butter some form of table worker is best to use. The butter bowl and paddle never give as good results because the butter will almost invariably be greasy, owing to the sliding motion of the paddle over the butter. The table workers commonly used are of two kinds—one having a stationary bed and a roller, either corrugated or smooth, arranged so that it can be passed back and forth over the surface of the butter; the other having a movable bed, revolving on a center, usually under two corrugated rollers. Both of these forms will do good work if the operator understands their use.

Suggestions as to Working.—If the salt and butter have been mixed in the churn the butter can be placed on the working table and the working begun at once. After the butter has been pressed out with the roller it should be divided in the center, one part being laid over onto the other and the rollers passed over again. The process should be repeated until the butter assumes what is termed a waxy condition. If the working is continued for too long a time the butter will become salvy, having the appearance of lard, and will lose its granular structure, becoming weak-bodied. The firmness of the butter must be taken into account in determining how long it should be worked. Usually the firmer the butter the more working it will stand and the more time it will need to thoroughly incorporate the salt and bring out the waxy condition.

Testing Saltiness While Working.—During the process of working, the butter should be tested frequently to determine its saltiness, and if by mistake too much salt has been added it can readily be removed from the butter by pouring a little cold water over it as the working continues. The water washes out the excess of salt.

XII. Care of Utensils.

Care of Utensils.—The worker, paddles, and prints that come in contact with the butter need special preparation before the work is begun. They should first be thoroughly scalded, and the scalding should continue long enough to make the surface of the wood hot, after which it should immediately be rinsed with cold water. This operation opens up the pores of the wood and then causes them to contract and form a smooth surface to which the butter will not stick. It also thoroughly wets the surface, which probably has a tendency to prevent the butter sticking.

BOOK II

PART II

Diseases of Cattle

HOW TO KNOW THEM; THEIR CAUSES, PRE-
VENTION AND CURE

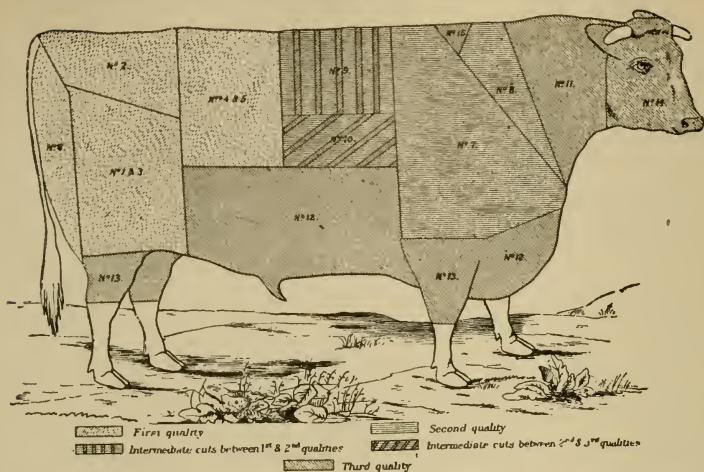


FIGURE 1

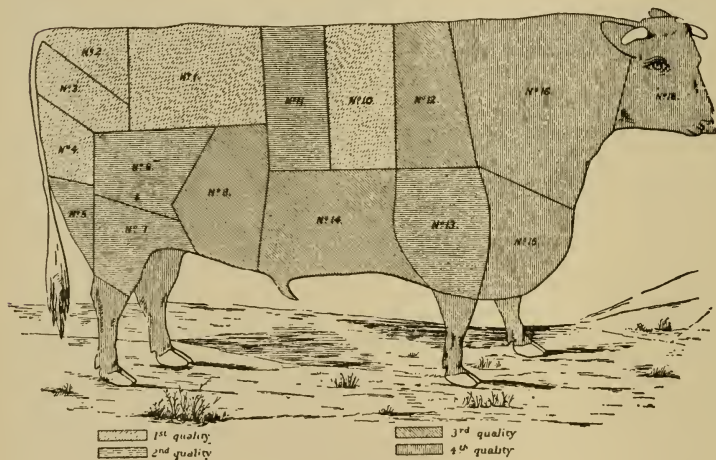


FIGURE 2.

The difference in the appreciation and value of the various cuts of meat in London and Paris is very great; and as these rules have been introduced also in the large cities of America, our stock-breeders are vitally interested, and should study this question, so they may know what portions of the body to develop by a judicious choice of breeding animals. For instance, a pound of the fillet represented by Nos. 4 and 5 in figure 1, and No. 1 in figure 2, is worth 44 cents in Paris, while the portions 13, 14 and 15 in figure 2, bring only 12½ to 14 cents. Nothing pays better than judicious and intelligent breeding of our meat supplies; and as the demand grows with the increase of population, the question assumes greater importance with each succeeding year.

DISEASES OF CATTLE.

CHAPTER I.

GENERAL PRINCIPLES.

I. IMPORTANCE OF THIS DEPARTMENT OF PRACTICE.—II. PATHOLOGY OF CATTLE AND OF THE HORSE COMPARED.—III. ACTION OF REMEDIES IN CATTLE.—IV. THE ONLY SAFE PRINCIPLES FOR MOST CATTLE OWNERS.—V. FAMILIARIZE YOURSELF WITH THE PHENOMENA OF HEALTH.—VI. THE PULSE, RESPIRATION AND TEMPERATURE.—VII. OTHER SPECIAL SIGNS OF DISEASE.

As cattle occupy a foremost place in the wealth and resources of the country, furnishing its beef, milk, butter and cheese, and, as secondary products, its hides, tallow, glue, animal charcoal, etc., the prevention of disease among them—especially of contagious diseases—and their treatment when sick become very important, not only from a financial standpoint, but also from considerations of the public health and comfort.

II. Pathology of Cattle and of the Horse Compared.

Cattle are a phlegmatic, plethoric race of animals, intended by nature to eat large quantities of bulky food, to be prepared for digestion while quietly lying down, by the process of rumination, and to take but little exercise. This fat, plethoric condition of the system renders them more susceptible to certain classes of diseases than the horse, especially to the blood poisons, that with them are so rapidly and certainly fatal, such as rinderpest, anthrax and Texas fever. On the other hand, their nervous organization being much less sensitive, they are not nearly so liable to attacks of such disorders as tetanus, paralysis, etc.

Cattle not being fed to produce muscle without fat, are not subject to lameness and disease of the air-passages to the same extent as the horse, with whom speed and endurance are the main points. In fact, soundness or unsoundness, as the terms are used by horsemen, is of little importance to the cattle owner, so long as the animal can move with any degree of comfort at all; while such affections of wind-passages as roaring, whistling and heaves are to him unknown. Still, that distressing, incurable disease, so common in the human race, pulmonary consumption

is very prevalent among cattle, especially milch cows, probably on account of the drain on them of giving milk; this weakens the system, making them more susceptible to the infection. It is thought by many to be primarily a bovine disease, the horse seeming to possess an almost total immunity to it.

On account of their lower grade of vitality, they are more susceptible to influences that develop local diseases, as, for example, the miasma of low, marshy ground, especially that which has been overflowed; and also to poor fodder, from must, or being affected with ergot, etc.

There is a peculiar sympathy in disease among cattle, as is illustrated in regard to abortion. It is a familiar experience that if one cow aborts through accident, one or more of the others will abort through sympathy.

Owing to their natural tendency to plethora, cattle seem peculiarly predisposed to malignant ulcers, swellings, glandular enlargements and even gangrene. To these they are more subject than any other of the domestic animals.

The nostrils, pharynx, larynx and trachea (wind-pipe) are much smaller than in the horse, which is one reason why they cannot travel so fast nor so long as the latter,—the wind fails. This also explains why suffocation is a more imminent danger in cases of throat inflammation in cattle than in horses, needing specially prompt and active treatment, even to the operation of tracheotomy.

The different arrangement of the digestive apparatus in cattle as compared with the horse, is very marked, the former having four distinct stomachs, while the latter has only one stomach, but a greater length of intestines, which are also much more sensitive. Inflammation of the bowels, so common with the horse, is quite rare with the ox.

Cattle are less tolerant of disease and pain than the horse. They give up in discouragement, after one or two attempts, and pine away under pain very fast. They soon become indifferent to life, often refusing to make one effort to rise when perfectly able to do so; and, as weakness follows more rapidly in inflammatory diseases, these require more energetic measures and an earlier administration of tonics and stimulants than when treating the horse.

III. Action of Remedies in Cattle.

Remembering the phlegmatic nature of cattle, remedies work very differently with them than with the horse. Medicines should always be given them in liquid form, and more bulky than for the horse; and they should contain something in the nature of a mild stimulant to hasten their passage through the first three stomachs, and on to the fourth stomach and intestines, where they can be taken up into the system by the absorbents.

Aloes, though so excellent a purgative for horses, is of no use with cattle; while epsom salts, that are so drastic and cold for horses, on cattle work like a charm. Calomel and other forms of mercury act violently on cattle, salivating them very soon, and is excreted through the milk, often affecting sucking calves seriously. Oils, used as purgatives, act well on cattle, and especially melted lard. Mustard, as a blister, acts with more vigor on cattle than on the horse, but turpentine less.

IV. The Only Safe Principles for Most Cattle Owners.

But few outside of the more common diseases of cattle will be treated of in this work, the better to adapt it for its ready use, as a book for reference, by the average stock owner; and the recipes will be as few and simple as they can be made without detracting from their value. It is a mistake to suppose that any great variety of violent drugs can be used with advantage by the public generally. The public would, no doubt, learn by experience, but it would be at the cost of losing many valuable animals. What we advocate and would like to instil into the minds of our readers, in conjunction with the importance of thorough preventive measures, is to treat the ordinary diseases as early and vigorously as possible, with the simplest efficient remedies, and when any extraordinary case arises requiring more violent means, to employ an educated, well qualified veterinary surgeon.

V. Familiarize Yourself with the Phenomena of Health.

As it is obvious that no person is fitted to treat disease who is unable to distinguish at least its prominent symptoms, every stock owner should familiarize himself with the ordinary phenomena of health, especially with the pulse, respiration and temperature. Scarcely less important than these, in many forms of disease, are the appearance of the hair and skin, and that of the eye; the posture and movements; and the character and frequency of the appetite, and also of the discharges.

VI. The Pulse, Respiration and Temperature.

The normal pulse in cattle ranges from fifty to fifty-five per minute; in old animals, but especially in calves, it is somewhat more. The pulse is the most conveniently taken from the artery passing up along the lower part of the neck on either side just under the cervical vertebræ, or else that beneath the tail. In health it is softer and less tense than it is in the horse.

The breathing it requires no special skill to diagnose—only a moderate amount of practice. The soft, rustling sound of the healthful “respiratory murmur,” when the ear is placed to the chest, is altogether changed when there is any ailment affecting the lungs or air passages. The number of respirations per minute (ordinarily ten to fifteen in cattle) can be

easily counted by the heaving of the chest. Some practice, however, will be required to make one a first-rate judge of the sound obtained by percussion, which, in health, is always clear and resonant. Percussion consists in placing the forefinger of the left hand upon the chest, and striking it smartly with the ends of the first three fingers of the right hand.

The temperature, in all animals, is a vital index of unsurpassed value. It can be approximately measured by feeling the skin, ears and legs,—in cattle the horns also, at their root. But what is termed the “clinical thermometer,” which is so shaped that its bulb can be conveniently inserted into the rectum, (to remain two or three minutes), is infinitely better, as it gives results so much more exact. Its use has established the important fact that different febrile diseases have different ranges of temperature, each having its own “dead-line,” beyond which recovery is impossible. Thus, a horse with cerebro-spinal meningitis will certainly die soon after reaching a temperature of 104° ; yet 108° or even 109° by no means indicate a fatal termination, in a case of pneumonia.

VII. Other Special Signs of Disease.

A “staring coat,” as it is termed, in which the hairs stand out like bristles, is an obvious symptom, and sometimes the only one, of a low state of health. Shivering, when the animal is exposed to only moderate cold or to none at all, challenges immediate attention; for it is, infallibly, the ushering in of an attack of some disease, usually severe. Cold sweat coming out on the skin of an animal severely ill indicates a desperate, if not fatal, condition. The posture when standing, the method of lying down or getting up, the action in moving around,—these are all significant, and should be noted carefully.

The countenance, and especially the eye, if observed closely, will betray the distress and pain which the dumb sufferer cannot express in words. The muzzle, which in health is moist, (or covered with “dew,” as many call it), in disease, especially in fever, becomes unnaturally hot and dry or cold, and sometimes changed in color—sometimes paler, but more commonly injected with blood. One of the earliest signs of serious constitutional disturbance, as well as of certain special disorders, in the case of cattle, is the suspension of rumination,—that is, ceasing to chew the cud. A nearly coincident general symptom, in cows, is the drying up of the milk.

CHAPTER II.

CONTAGIOUS DISEASES.

I. CONTAGIOUS PLEURO-PNEUMONIA.—II. RINDERPEST OR CATTLE PLAGUE.—
III. TEXAS FEVER, SPANISH OR SPLENIC FEVER.—IV. CONTAGIOUS ECZEMA,
FOOT AND MOUTH DISEASE OR EPIZOOTIC APHTHA.—V. ANTHRAX.—VI. VARIOLA
VACCINAE OR COW-POX.—VII. TUBERCULOSIS.—VIII. CANCEROUS
ULCERS AND OSTEO SARCOMA.—IX. LUMPY JAW.—X. CONTAGIOUS ABOR-
TION OF CATTLE.

I. Contagious Pleuro-Pneumonia.

This is the most fatal and contagious of the diseases to which cattle are subject, except rinderpest (a contagious enteric fever), which has never yet gotten a hold in America, and Texas or Spanish fever (splenic fever). It was first introduced into the United States in 1843, at Brooklyn, Long Island, by a cow that was purchased from the captain of an English vessel, and several times since then, at various other ports, in the bodies of imported cattle. It spread more or less slowly through parts of New York, Massachusetts, Pennsylvania, New Jersey, Maryland, Delaware, Virginia, District of Columbia, Ohio, Illinois, Kentucky and Missouri. Through the combined efforts of the Federal government, exerted through the Bureau of Animal Industry, and the various state governments, it has been effectually stamped out by quarantining and slaughtering all cattle in infected districts. This was done at an enormous expense, but it is the only way of radically ridding the country of this most insidious disease.

It is a contagious fever of cattle, with local inflammation of the pleura, (the thin membrane lining the thorax and investing the lungs), and the lungs, accompanied by great prostration, and in its more malignant forms ending in death in a few days. It is, however, often slow in its development, weeks, or even months elapsing during which the contagion works in the system, before finally revealing its fatal symptoms.

So terribly contagious is this disease, and so insidious in its spread, that exposed cattle may be transported long distances before it breaks out. The period of incubation is very indefinite, ranging from eighteen days to two months. It develops in different cattle in all degrees of severity from a small focus of pneumonia, the size of a walnut, or a patch of pleurisy two inches in diameter, to a complete consolidation of both lungs, or a pleurisy involving every square inch of the lining of the chest. Mild cases appear to recover; they will show all the signs of good health, will feed well, fatten fast, cows will breed and give milk, as usual, but they do not recover; they simply

become chronic, and the focus of the disease is liable to break through the capsule that surrounds it, and reinfect that animal at any time, and thus form a new focus from which the disease may spread to other animals.



PLEURO-PNEUMONIA.

Section of affected lung in contagious pleuro-pneumonia. The thin end shows black hepatization; the center, red. At the thick end interlobular infiltration and several blocked vessels are shown.

Hence, the farmer suspecting it in his herd should at once apply to a competent veterinary surgeon, if there is one within reach, to verify the disease. If such expert authority be not at hand; kill the animal or animals at once, slash the skin to prevent any person from digging the animal up for the sake of the hide, and bury deeply; if quick lime can be gotten, use it freely over the carcass. Then disinfect carefully all stables and outhouses, and in case other animals are suspected, isolate and quarantine them and await developments.

How to know it.—The earlier symptoms are apt to pass unnoticed. The first is a rise in temperature to 103° or 106° F., shown by introducing a clinical thermometer into the rectum, the normal temperature being on an average of 101.5° F.; there will be loss of appetite; a staring coat; slight shiverings; a hard, dry cough; a loss of milk; scanty urine, higher or darker colored than usual. Then will follow tenderness upon pressure between the ribs over the lungs; the cough will increase; and the breathing quicken; the nose will extend, the back be arched; the hind legs will be drawn under the body, and the elbows will be turned out. Later, there will be a watery or a more pronounced discharge of matter from the eyes and nose; obstinate constipation, or a watery foetid diarrhoea; a rapid weakening of the system, ending in death.

Upon percussion (striking) over the lungs, there will be given back, in the earlier stages, a clear resonant sound; later, it will be dull and heavy. So, in the first stage, there will be a dry crackling sound; later, it will be a whistling or rough breathing sound. Any of these may be easily distinguished from the sound occasioned by percussion upon an animal in health.

In America pleuro-pneumonia does not show the most violent symptoms except in warm weather. Yet this very slow incubation shows the extreme

care that should be exercised in watchfulness. The seeds of the disease once in the system, the incubation is only a question of time, and warm weather will bring out the disease in all its intensity. But none of the above symptoms are conclusive of contagious pleuro-pneumonia, for all of them are seen in the non-contagious form of it. The history of the cases, one after another coming down with the same disease without any apparent reason for it in the way of exposure, the failure of the disease to respond to treatment, and the peculiar post mortem lesions found in it are the points to be relied upon in making a diagnosis. The characteristic post mortem lesions can be determined only by a competent veterinarian of experience with the disease.

What to do.—As to remedial measures, it seems useless for the farmer to resort to them, since this is a disease that the veterinarian alone can cope with, and then only when perfect isolation may be had. The safest and also the cheapest plan, is prompt killing and burial of infected animals, thorough isolation of the rest of the herd, which should be fattened and marketed for beef under veterinary inspection at the time of slaughter, to determine what is fit or unfit for human food, and perfect disinfection of the premises. In the matter of disinfection, the easiest, cheapest and best way is to remove all animals from the barn or shed, and close it up tightly and burn sulphur in it for a couple of hours; then open and air it, and whitewash it thoroughly with lime.

Prevention.—Proper quarantines of stock imported into this country, for a period of time sufficiently long to decide for a certainty that no latent contagion is hanging around them, say two months; destruction of all affected animals; and isolation of those that have been exposed to the contagion. Some very high authorities in Europe recommend inoculation of those that have been exposed, and even of whole herds and dairies. It is a disease, the occurrence of which in an animal once, confers immunity from subsequent attacks. It is found that inoculation does not always produce the same disease, at least the disease produced by inoculation is not always located in the same place, but the constitutional effect is produced with the same result of immunity from subsequent attacks as the original disease; and the proportion of deaths among inoculated animals is small as compared with those who take the disease in its regular course.

The conclusions arrived at by the Belgian Commission in regard to inoculation, as stated by Prof. Gamgee, are as follows:

- “1. The inoculation of the liquid extracted from the lungs of an animal affected with pleuro-pneumonia does not transmit to healthy animals of the same species the same disease, at all events so far as its seat is concerned.
2. The appreciable phenomena which follow the inoculation are those of

local inflammation which is circumscribed and slight on a certain number of animals inoculated; extensive and diffuse, with general reaction proportioned to the local disease, and complicated by gangrenous accidents on another number of inoculated animals, so that even death may result.

3. The inoculation of the liquid from the lungs of an animal affected with pleuro-pneumonia exerts a preservative influence, and invests the economy of the larger number of animals subjected to its influence with an immunity which protects them from the contagion of this malady, during a period which has yet to be determined."

The losses sustained during the experiments of the Commission amounted to 11.11 per cent. The number of animals on which the effect of inoculation was benignant, was 61.11 per cent.; the proportion in which there was gangrene and loss of a portion of the tail, 27.77 per cent.; in twenty-one subjects the inflammation was very severe, and complicated by gangrenous phenomena, causing the death of six; and, lastly, the recoveries amounted to 88.88 per cent.

The place recommended to insert the virus is on the end of the tail, it being less liable to work violently, and terminate fatally from gangrene, when inserted there than at any other part.

II. Rinderpest, or Contagious Enteric Fever.

General Description.—Whatever may be said to the contrary, this terrible plague has never yet been introduced into any of the countries of the American hemisphere. At least, there is no well authenticated record of any case. Its ravages have been mostly confined to the herds of Europe and Asia, and especially to those of the southern portion of European Russia and adjacent districts. It is devoutly to be hoped it never will find its way to America, for it is terribly contagious, desperately fatal, and swift in its work of death. Where it originally started is not known. In Southern Russia, on the Asiatic steppes, in various parts of India, in Southern and Southwestern China, Cochin China, in Mongolia, Burmah, Hindostan, Persia, Thibet and Ceylon, it has long been known, and has been carried thence to various European States.

The principle of contagion has not yet been discovered, but when once an animal is affected, it extends to every tissue and secretion. It is, however, mostly contained in the secretions of the mucous membranes, and healthy animals will be infected by coming near infected animals, or near anything contaminated by their secretions and exhalations, and without actual contact. So, any object may be infected, and carry the disease indefinitely, as clothing, wool, hay, straw, litter, wood-work, for it may remain latent in any of these objects for a long time. Fortunately, air is

said to be the most potent and effective means of destroying the virus; and hence, through aeration by a direct and continuous current of air is one of the best ways of diluting, and at length destroying, the seeds of this dread disease.

So quick is the development of the disease that death sometimes occurs after the second day, though usually after the fifth day; and an average of from seventy to eighty per cent. of the animals attacked die. Goats, sheep and deer are also attacked, and the probability is that all ruminating animals are subject to the contagion; but sheep and goats are not liable to so large a percentage of mortality as are neat cattle.

Many of the symptoms of rinderpest occur in pleuro-pneumonia in its contagious form; also, in malignant catarrhal fever, and in foot-and-mouth disease. But pleuro-pneumonia is distinguished from rinderpest by the absence of the characteristic eruptions upon the mucous membranes. Malignant catarrhal fever is distinguished therefrom by the dimness of the transparent cornea of the eye, which in rinderpest remains clear. The foot-and-mouth disease differs from rinderpest by ulceration of the feet, and the less degree of fever.

The alteration of the mucous membrane in rinderpest, heretofore spoken of, may very soon be observed in the vagina of cows, which becomes spotted or striped with red, and, in about twenty-four hours after, small yellowish white or gray specks are clearly distinguished on the red spots and stripes. These are formed by the loosening of the cuticle, which may be rubbed off, leaving in its place a dark red depression.

There is no known remedy for this disease, and hence the only security against its spread is in the enactment of the most stringent laws, first, for its prevention; second, for its extinction, by isolation of all suspected animals, and the prompt killing and burial of all infected ones. In this respect the laws of the German Empire are the most perfect, and our State and general governments might take a lesson therefrom, in dealing with pleuro-pneumonia and other malignant contagious diseases of animals, if the machinery of politics could be successfully dissociated from the appointment of officers for the investigations sought.

When an animal has this disease and recovers, he is rendered insusceptible to another attack.

How to know it.—A perceptible rise in the temperature of the body occurs about two days before any other symptoms present themselves; and it has been shown that the virus exists in the blood at the time a rise in temperature is first noticed. Inoculation with serum of the blood taken from an animal at this time, will produce the disease. The temperature in the course of two days rises to 104° or 105° F., when the following

symptoms will be noticed: Shivering; muscular twitching; restlessness; colicky pains; sometimes a husky cough; yawning; great dullness, with drooping of the ears; occasional fits of delirium; the appetite is soon lost; the milk of cows is suddenly and entirely stopped, more so than in any other disease. In the later stages, the animal grinds its teeth; arches its back; draws its legs together; moans and grunts with each expiration, at which time the breath is held for an instant and then expelled with a grunt. At first the bowels are constipated, but this condition is soon followed by violent purging; the dry, hot, red condition of the eyes, nose and mouth, which exist in the early stage, is followed by a discharge of a glairy, watery



RINDERPEST.

character, soon running into an opaque and turbid form, which is very typical of the disease. In some cases the visible mucous membranes become altered in appearance, by assuming a salmon-red appearance over the whole extent, with deep crimson red patches dotted over the surface. When lying down, the head is usually turned upon the upper flank; the twitching of the muscles will be noticed more about

the neck, shoulders and hind quarters. The discharges from the bowels are at first black, but soon change to a pale greenish brown; they are very foetid and are voided with much straining. The urine is scanty and high colored, and sometimes albuminous. The pulse rises to 120° to 140° per minute; the surface of the body gets deathly cold; weakness increases, the animal lying most of the time; the areolar tissue becomes, in most cases, bloated with air; the animal becomes drowsy, and soon after unconsciousness sets in; the nostrils flap; the mucous membranes become lead-colored, with purple patches; flatulence supervenes, with involuntary evacuation of feces, and death soon follows.

Sometimes the eruption covers the entire body, and, again, it may be wholly wanting.

III. Texas Fever, Spanish or Splenic Fever.

This disease is indigenous to the lowlands of Mexico, Texas and other Southern States. It is due to a germ (micrococcus) that takes up its habitat in the red blood corpuscles, causing death by destroying them. These germs are carried from place to place and from animal to animal by Texas

ticks that infest the cattle in the South in large numbers. Southern native cattle become immune to the disease, but Northern cattle taken South take the disease and die. Southern cattle taken North, in warm weather, carry the ticks with them, from which the disease spreads by their biting the Northern cattle, or by the cattle eating the ticks that drop onto the grass, or by eating the excrement of the ticks. Frost kills the ticks; on this account it is considered safe to drive Southern cattle North during the winter, but fatal to Northern cattle during the summer. Southern cattle wintered in the North lose their immunity and then are susceptible to it, the same as Northern cattle. On account of the tremendous losses from this disease, the Western States have enacted laws preventing Southern cattle from being driven North, except during the winter, and Illinois requires them to be shipped in special cars, into a special section of the Union Stock Yards, and driven to slaughter through special roads to avoid any danger of infecting Northern cattle that might be taken back to the country as feeders. The mortality runs from 70 per cent. upwards.

It has long been desired to take fancy Northern bulls South to improve the grade of Southern cattle, but until now it has been impossible to do so on account of their almost certain death from Texas fever, but now (1898) vaccination of such bulls, with an antitoxin got from the cultivation of the germs of it, is being quite extensively used with good success. The antitoxin can be got from most of the Agricultural Experimental Stations, with directions how to use it.

Incubation.—The stage of incubation is from seven to thirty-five days. The blood undergoes a material change, and some of its elements escape into the various tissues of the body and into the urine, giving the latter a bloody appearance.

How to know it.—As in pleuro-pneumonia, a marked symptom is an increase of heat, to 104° to 106°; the pulse rises from 40 beats a minute (the average for healthy steers) up to 120 a minute. The fever is generally preceded by a chill; the dung and urine become scanty, high colored, or bloody; the milk fails rapidly; yellow matter is discharged from the nostrils and mouth; the animal assumes a peculiarly dejected look; the back is arched; the flanks become hollow; the gait unsteady or staggering, and the hair rough; the cough is more or less frequent; the urine coagulates on boiling; the mucous membranes are deep yellow or brown color, and that of the rectum dark red. There is but little trace of disease in the first three stomachs, but the fourth stomach shows congestion, and the intestines are still more gorged and blood-stained. The liver is not seriously affected, but the gall bladder is filled with thick, dark colored bile; the kidneys are also congested, and the secretion in the bladder is bloody or blood-stained;

the spleen is much affected and enlarged. In a healthy animal the spleen should weigh a pound or a pound and a half; in cattle dying of Texas fever it has been known to reach a weight of eight pounds; hence, the specific name of splenic fever.

What to do.—Treatment for this disease, like that for pleuro-pneumonia and rinderpest, is not satisfactory in the majority of cases. There is this point, however, in the treatment—since cattle infested from Texans do not give it to others, and since isolation is a security against contagion, the animals should at once be put into comfortable quarters and receive good nursing.

IV. Contagious Eczema, Foot and Mouth Disease, or Epizootic Aphtha.

This disease is known in America, but it is very common in the older countries. Owing to its very short period of incubation—twenty-four hours to three or four days—there is very little danger of its importation; and quarantining any affected herds before allowing them to land, will effectually prevent its introduction.

It is an eczematous or skin disease affecting the mouth, tongue, lips, feet, legs and udder. The contagion lies in the discharges from the mouth and feet, and the virus is strewn along the road and over the pastures by the droppings from the mouth, and the matter running from the feet, and is conveyed from field to field by small vermin, dogs, cats, etc.



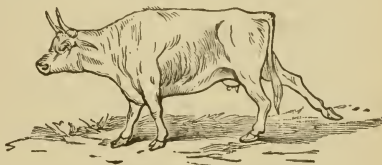
**EPIZOOTIC APHTHA OR FOOT
AND MOUTH DISEASE.**

It is contagious to nearly all the lower animals and to man. It is not often fatal, but it causes much loss to the stock owner, through the loss of flesh in cattle that are being fattened, and the failure in milk, the supply being lessened by from one to two-thirds of the usual yield.

The milk is affected not only in quantity, but contains much of the poison of the disease, and affects young animals to which it is given warm, causing cramps, violent diarrhoea, intestinal irritation, which often prove fatal. It is considered by good authorities to be equally injurious to infants. By the aid of the microscope vibrioides, bacteria and monads are found, which appear to be more injurious to the consumer when the milk is drank warm, fresh from the cow. Some authorities say to boil it before using, and others that this makes no difference, but it is certainly less injurious when it has stood a few hours and got thoroughly cold.

How to know it.—The usual symptoms are rough, staring coat; shivering fits, dry, hot mouth and muzzle; pulse and temperature raised; the

mouth, tongue, lips, teats, udder and interdigital spaces become red, swollen and sore; on the second or third day little pustules break and discharge; saliva drolls from the mouth; the animal keeps working the tongue in great uneasiness; lameness in the feet is seen, the fever in them being sometimes such as to cause the hoofs to drop off, the joints to become opened, and extensive sloughing to take place. There is great inclination to lie down. The greatest damage to the feet is seen among sheep and swine. The latter sometimes lose some of the digital bones.



EPIZOOTIC APHTHA.
Indications of the feet being affected.

What to do.—The treatment is of little consequence, as the disease runs a definite course, and usually terminates in recovery in about fifteen days. Give soft food to eat and a bountiful supply of clear cold water to drink; an ounce of saltpeter dissolved in each pail is an advantage. Pay the most attention to the feet, wash them clean and remove any horn that may be detached; if the inflammation and swelling are great, apply a linseed poultice till there are raw surfaces, then change them to the following lotion:

- | | |
|--------|--------------------------|
| No. 1. | 1 Ounce sugar of lead, |
| | 2 Drachms carbolic acid, |
| | 1 Ounce laudanum, |
| | Water to make one pint, |
| | Mix. |

Apply three times a day. When suppuration ceases, bind the feet up in tar bandages. If great weakness follows, with prostration and loss of appetite, give whiskey, brandy, etc., in oatmeal gruel. Give no purgatives, not even a laxative; for the bowels, although constipated at first, soon become loose and should not be interfered with, as that is one of the efforts of nature to expel the poison from the system; and never bleed. If extensive sloughing around the feet takes place, apply the following lotion:

- | | |
|--------|-------------------------|
| No. 2. | One part carbolic acid, |
| | Eight parts olive oil, |
| | Mix. |

Apply three times a day.

V. Anthrax.

This is known by many different names, according to the part attacked, and the impression made upon the mind of the person describing it—

Black Leg, Black Quarter, Quarter Ill, Charbon, Chancre a la Langue, Sang de Rate, Mal de Sang, Splenic Apoplexy and Braxy in Sheep, Bloody Murrain, etc. Under the above names are included a group of diseases very virulent, malignant and contagious, appearing under different forms, externally and internally, and attacking the different species of lower animals and man, in an epizootic, enzootic or sporadic manner, according to the influences that produce it, or whether it is got by inoculation. It arises spontaneously in low, damp, rich pastures, and along the banks of overflowed rivers, or where ponds have been drained off or dried up, the soil containing a great amount of organic matter, and when cattle are fattened too fast, by feeding on rich, succulent food, especially clover. Long continued warm, dry weather, favoring the emanations of organic matter and miasmatic gases, with great changes in temperature between day and night, especially in a still atmosphere, favor its development.

The main characteristic of the disease is black, tarry blood, that will not coagulate, and containing rod-like bodies (*bacilli*) containing spores, which are the active part of the virus. Blood containing these spores has been dried, reduced to dust, and kept four years, and found to be as active as ever in producing the fatal disease. (Koch.) The spores do not continue to increase after death, and are not found in any great quantity. The rods are found in greatest quantity in the spleen. The spleen, liver and lymphatic glands enlarge and become soft. The bloody flux may locate in any part of the body, with the tendency to gangrene, death and decomposition of the part affected, and the formation of gases that distend the tissues, making a crackling noise when the hand is passed over it. When it commences on one point of the surface, a small blister forms, gathers, breaks and dries up, and others form around it, and so on in consecutive rings it spreads. This constitutes malignant pustule, and is the form it usually takes in man, got by inoculation, from handling carcasses and skinning animals dead from anthrax, handling dirty rags, etc.

Anthrax has two distinct ways of manifesting itself, with external lesions and without them. To the former belong the black leg, black quarter, or bloody murrain, black tongue, Siberian boil plague, and carbuncular erysipelas of sheep and swine, and malignant sore throat of the latter; to the latter, all those having specific changes in the blood, with engorgement of the spleen, exudations and blood-stained spots in the internal organs, and sudden death.

The *Siberian Boil Plague* attacks horses, cattle, sheep, goats and pigs, and manifests itself in swellings on the sheath, udder, throat, breast, dewlap, etc., which are hard, yellowish, and streaked with red, and sometimes spotted. The animals die in from twelve to twenty-four hours. This, inoculated into man, produces malignant pustule or charbon.

Black leg or bloody murrain is not typical anthrax, but is anthracoid, with a special germ as the active principle of the virus, characterized by engorgement of a quarter or a leg, shoulder or a side. It usually occurs among young, fast growing, thriving cattle, and is so sudden in its attack,



CARBUNCULAR ERYSIPELAS—BLACK
LEG OR QUARTER ILL.

short in its duration, and fatal in its effect, that one or two of a herd may be found dead in the morning, when nothing whatever was wrong with them the night before. There is a stiffness in the affected quarter, with some diffuse swelling and heat, fever, and an appearance of plethora; the swollen quarter soon mortifies, becomes cold, gas forms under the skin and crackles if rubbed, and death soon follows. Sometimes there is an effusion of yellow looking lymph from the swelling. Recovery is very rare, and is slow and tedious, and the swelling is apt to slough extensively and form sluggish, unsightly sores.

The black tongue is seen in cattle; and sometimes in horses, and is known by red purple or black blisters on the tongue, palate and cheeks, sometimes attaining the size of a hen's egg; they burst and run an ichorous, scalding matter, and the sore becomes unhealthy and ulcer-like, with more or less swelling; the discharge, as it runs from the mouth, is bloody; the fever runs very high, the system becomes poisoned throughout, and death ensues in twenty to forty-eight hours.

Carbuncular erysipelas or braxy in sheep corresponds to black leg in cattle, and, like it, always attacks the finest, fattest and most thriving one in the flock. The symptoms are the same as in black leg, and death follows in from ten to sixty hours.

Swine have the carbuncular erysipelas the same as sheep; also, black tongue, tumors about the throat, and pharyngeal anthrax; the latter is the most common form, and is probably caused by eating the carcass of some anthrax animal. There is fever, swelling about the throat, neck and breast, which is red, shining, tender, and soon becomes purple, cold and insensible, and pits upon pressure; nausea, vomiting, retching, and loss of appetite; purple patches form around the eyes and on the snout; breathing becomes difficult, and the mouth livid; the temperature falls, and death follows in from one to two days.



GLOSS-ANTHRAX OR BLACK TONGUE.

Dogs, cats and other small animals die from anthrax, developed in the

same manner as it is in pigs, and coming from their eating anthrax carcasses. They are affected in the mouth, throat and digestive organs, giving rise to vomiting, fever and death.

Birds and poultry die of anthrax, from eating bits of anthrax victims. It develops in them in fever and swelling on the head, comb, breast and feet, which turn black from mortification.

In man, malignant pustule or charbon develops by inoculation; a small red spot shows itself with itching, and increases in size. In the course of twelve hours, a blister forms, breaks, dries, and a new crop springs up around the old one, and so it spreads. The affected parts run through all the shades of color from red to black, when gangrene sets in, and sloughs in case of recovery, but, alas, it is too often fatal, the same as in the lower animals.

Anthrax without external swelling is known as anthrax fever, splenic apoplexy, braxy, etc., according to the animals attacked. Horses, cattle, sheep, swine and fowls are liable to attacks of anthrax fever. This is characterized by high fever, plethora, engorgement of the spleen and other internal organs, and colicky pain; redness, and often purple spots, are seen on the mucous membranes; bloody, frothy mucous comes from the nose and eyes; the dung is streaked with blood; great weakness follows, and death in from twelve hours to four or five days.

What to do.—Treatment is of no avail in the first cases, owing to the rapid fatality of the disease, and is usually unavailing in milder ones, but liberal administration of whiskey, quinine and hyposulphite of soda may do good. Mix an ounce of quinine in a quart of whiskey, and give half of a teacupful every four hours to horses, twice as much to cattle, half as much to sheep and hogs. This dose should be diluted with as much water. Give of the hyposulphite of soda four ounces in half a pint of water to horses three times a day, twice as much to cattle, half as much to sheep and hogs. If they will eat, the soda may be given in their food. If one animal in a herd remains lying in the morning when the rest have got up and gone to feeding, suspect black leg at once, get him up and start him walking. Exercise, if pushed in the early stage of this trouble will often save them. Sponge off the body with cold water and rub dry; cauterize all wounds, if the disease comes through inoculation, with clear carbolic acid, sulphuric or nitric acid, or with chloride of zinc, but the whole of the diseased tissue must be reached. After cauterizing them, and also the tumors that may follow, apply poultices to them to encourage suppuration. In case of diffuse swellings, bathe them with vinegar, cold water and weak lotions of carbolic acid, etc.—say one part to sixty of water; and inject beneath the skin, in several places, weak dilutions of carbolic acid—one part of acid to one hundred of water.

Prevention —Drain the soil in the pastures; either confine the stock to smaller pastures or increase the stock to feed the pasture more closely; when cattle, especially young ones, are thriving very fast on a rich succulent pasture or aftermath, confine them in a barn-yard four to six hours a day. Shelter the stock at night during late summer and fall, when the days are hot and nights cool, or rather cold,—when the dews are heavy and the air gets quite chilly towards morning; it is at this time that internal congestions are apt to occur. In dry, hot weather, remove the stock to high ground, where miasmatic gases exist to a less extent. Secure clear, pure water to drink; avoid too sudden fattening; see that barns and sheds are well ventilated and not overcrowded. The diseased animals should be separated from the healthy; carcasses should be burned without being skinned. Pour kerosene over them and set fire to them, also to all litter they had used, and to their excrement. The buildings where deaths have occurred or sick animals been, should be thoroughly disinfected. Avoid touching them, so far as possible, and wash the hands both before and after doing so, in carbolic acid, one to one hundred of water. Prevent dogs, cats, etc., from coming in contact with them, and never allow meat that is affected, or suspected of being affected, to be eaten. Prevention by vaccination with an antitoxin is successfully done now (1900) in all civilized countries, where veterinary science is recognized and encouraged. The material is injected underneath the skin of all exposed animals, horses, cattle and sheep, which renders immunity to them to the contagion. The vaccine for anthrax and black leg can be gotten from the various agricultural experiment stations, and from the Pasteur Vaccine Company in Chicago, Ill., with full directions for use. Some sections of the country are sadly afflicted annually with these diseases. In such localities vaccination should be resorted to every spring.

VI. *Variola Vaccinae*, or Cow Pox.

This is a contagious disease, and has been proven to be identical with small-pox of the human family; either can be produced in either men or cattle by inoculation from the other species. A heifer inoculated with virus of small-pox, will have a disease identical with the cow-pox; and men inoculated with cow-pox will have a disease that may be considered either cow-pox or a very mild form of small-pox. To have either, secures immunity from a subsequent attack at least to a great extent, or for a longer or shorter period, sometimes only for a year or two, and sometimes for a lifetime. Cow or kine-pox is a specific blood poison that has a period of incubation of three to nine days, shows itself by a slight fever for a couple of days, then breaks out in pimples on the teats, udder flanks, escutcheon, and around the vulva, nose, mouth and eyes. These

pimples, red at first, enlarge from day to day, till they attain a diameter of about half an inch to an inch, and become yellow. A distinct vesicle forms, breaks, runs a yellowish lymph, which is the active virus of the disease, dries up, a scab forms over it, and the whole trouble disappears as gently as it came.

The only trouble to be had from the disease, is in milch cows, from the teats getting sore. These are sometimes absolutely covered with the vesicles, and even confluent, rendering milking a very painful operation.

It runs a definite course, and heals up and disappears of itself, in from ten to twenty days. No treatment is necessary, except to avoid taking cold, and give a little extra care in the way of nursing.

If the teats are so sore as to be very painful in milking, the teat syphon may be



THE TEAT SYPHON.

used; if it is cold weather, warm the syphon; oil it with olive oil, and pass it up the teat very carefully, and draw off the milk. Anoint the sores on the teats and udder nicely, twice a day, with carbolic salve or other healing and softening ointment. If the udder swells very much, frequent bathing with hot water and supporting with a bandage, as recommended for mammitis, will be a benefit.

VII. Tuberculosis.

This disease is distinctly infectious, being due to the introduction into the system of a microbe, the *bacillus tuberculosis*, discovered by Koch in 1882. It affects all warm blooded animals, including people. Cattle and people suffer the most from it, and horses the least, in fact the latter are almost exempt, but it can be produced in them by inoculation. The germ is a rod shaped vegetable organism, $\frac{1}{7000}$ of an inch in length. When introduced into any tissue of the body it multiplies, causing slight local inflammation that is inclined to degenerate into caseous (cheesy) matter, that becomes gritty by the deposition of calcareous (limey) matter, giving it the appearance of being mixed with sand. The germs usually divide into colonies, making separate foci of the disease. When the number of germs is small and the deposition of the lime rapid, a fibrous capsule often forms around the little center of disease, fencing it in and rendering it harmless, and the animal is none the worse for the attack; but on the other hand, if the number of germs is great and the deposition of lime slow or wanting, which it is in some cases, the tissue affected is destroyed, breaks down and liquifies more or less, leading on to a debilitated, anemic condition of the whole system, resulting in extensive blood poisoning (cachexia) and death. The latter course is the usual one for it to take in man or

beast. No tissue of the body is exempt from its ravages, the lungs and thoracic lymphatic glands being most often affected. The first appearance of this disease is in the form of miliary tubercles, which may become fenced in as described above, or by ulceration the germs are liberated and invade surrounding tissues, sometimes forming malignant tumors and sometimes leading on to complete destruction of the organ attacked. Miliary tubercles are about the size of a small pea, and are usually seen in the greatest number on the peritoneum and pleura lining the chest. In all severe cases the disease overcomes nature's efforts to confine it and becomes generalized, causing cachexia, when the flesh and milk are unfit for food. Inasmuch as it is difficult to determine when it is becoming generalized, and as it is decidedly dangerous for people to eat meat and drink milk that contain bacilli tuberculosis, it is proper to condemn all carcasses that show more than slight localized infection, and those to be passed should show the diseased parts well advanced in the calcareous stage. It is no longer considered hereditary, but due in all cases to infection, usually, we think, by inhaling the germs that are flying in dust, or by eating or drinking them with the food and water.

How to know it.—It is impossible to recognize it till it is far advanced and cachexia is developing, the earliest symptoms being a general unthrifty condition, the milk becoming poor in quality, thin and watery, although not much less in quantity. The appetite is capricious; the hair looks dull, and where it is white, there is a yellow skin; a dry, dull cough will be noticed; the animal no longer licks itself; if the cow is with calf, she is apt to abort. Emaciation ushers in the second stage, and progresses rapidly; the cough gets worse; indigestion, tympanitis and diarrhoea follow, and soon reduce the sufferer to skin and bones. Auscultation, and percussion of the lungs may or may not detect a fullness and muffled breathing and other signs of disease, but nearly always some pain will be evinced when the sides are struck, or the fingers pushed forcibly in between the ribs. The tubercles increase, sometimes breaking out on the surface of the body; the blood gets thin and watery, wanting in red corpuscles; and, often, fatal diarrhoea sets in.

To test an animal or herd suspected of tuberculosis, tuberculin is used. It can be got from the Bureau of Animal Industry at Washington, D. C., or from the State Experimental Stations. The animal's temperature is taken morning, noon, and night, before the injection, to get the average temperature, then inject the tuberculin about 11 o'clock at night, and begin taking the temperature next morning at 6 o'clock, and take it every two hours till 6 at night. If the injection causes a rise of temperature to 104° Fahrenheit at any time during the day the animal should be condemned and slaughtered, subject to veterinary inspection. If an animal reacts or shows a rise of temperature between 103° and 103.9°, he should be tested again after a week. This test is very delicate and remarkably certain, there be-

ing but few exceptions to the rule that tuberculosis will be found post mortem in all that react to 104° F. Usually those far advanced in the disease will not react, but they can be recognized by physical examination. To avoid mistakes, do not test an animal that has a fever, nor cows just before nor just after calving, nor when in heat, but rather wait a few days.

What to do.—All affected animals should be killed, and the carcasses burned or rendered. All suspects should be isolated and tested, bearing in mind that it is bound to spread, and that the first loss is usually the smallest. The stable should be thoroughly cleaned by first sprinkling to lay the dust, then sweep, scrape, wash, and whitewash it. The treatment of affected ones, if it is desired, consists in counter-irritation to the chest by applying mustard paste or fly blister repeatedly, and giving oleaginous foods, as oil-cake, cocoanut oil, etc., in liberal quantities, which will sometimes keep them along a good while. Avoid roots and grasses, since, in the weak condition of the digestive organs, these tend to produce tympanitis; but by suitable fattening food, supplemented by the use of cod-liver oil to the amount of half a pint a day, they may be fattened fast, if taken during the first stage. This secured, they might as well be slaughtered by the butcher; in later stages, nothing can be done to prevent gradual pining and death. The oil is best given with lime water; a little oil of turpentine may be added, if there is a tendency to tympanitis and diarrhœa.

The following recipe may be of service along with the generous diet:

No. 11.	2 Drachms saccharized carbonate of iron,
	2 Drachms powdered cinchona bark,
	Mix.

Give as one dose in soft feed, twice a day.

VIII. Cancerous Ulcers and Osteo Sarcoma.

Tuberculosis sometimes shows externally, attacking the glands, especially the parotid and sub-maxillary, or the bones, in the latter case being known as cancer of the bone, or more strictly, *Osteo Sarcoma*. This enlargement of the bones may come on the jaws, ribs or any part of the body. The tubercular deposits usually start in small, loose nodules, which increase in size till inflammation sets in, and nutrition being cut off from the skin, the latter sloughs off, leaving a large raw sore that defies all treatment and, instead of getting better, grows worse continually. Larger and more angry-looking becomes the sore; an ulcerous, sanæous discharge flows from it; other ulcers are likely to form around it; and the enlargement beneath increases till, if the trouble is in the glands above-mentioned, it presses upon the pharynx and larynx, thus interfering with the breathing and swallowing.

Tubercles sometimes locate around joints, causing lameness, which is aggravated by strong liniments and blisters.

Treatment is of no avail, further than to afford a suitably generous diet, but it is best to deal with these as prescribed for tuberculosis.

IX. Lumpy Jaw (*Actinomycosis*).

This is an infectious disease affecting cattle very commonly in the Western States of this country, especially Illinois, Iowa, Kansas and Nebraska. Its spread is gradual and continuous. If an affected animal is taken into a herd of healthy cattle, it will surely break out among them, and from five to fifty per cent. will get it in the course of six to twelve months. The cause lies in the presence of a ray shaped fungus germ called actinomycetes, hence the name actinomycosis, by which scientific term the disease is known. This germ is taken in with the food in most cases, and may locate in any part of the body. The parts most often affected are the jaw bones, tongue, glands around the head and throat, lungs, liver and in the walls of the small intestines. The germ enters the jaw bone through



LUMP JAW.



ACTINOMYCOSIS OF THE
LOWER JAW.

a split or decayed tooth, or an abrasion of the gum, then it grows, increases in numbers rapidly, and invades and destroys the bone in every direction. It enters the tongue and glands about the throat and various parts of the digestive tract and liver through abrasions of the mucous membrane or through ducts. It enters the lungs probably by being inhaled with dust. When it has become located in any part of the body in one of these ways, small portions or sprouts, as it were, may be carried to and infect any other part of the body through the blood. This disease also occasionally affects hogs, horses, rabbits, elephants and people; the latter rather frequently and always seriously, proving fatal in most cases in the course of six weeks to eighteen months. It runs a mild course in cattle, not causing death except as a result of interference with mastication or swallowing, then they become emaciated and weak and die from want of nutrition.

How to know it.—In all cases tumors form at the seat of infection. When the jaw bones are affected they swell, sometimes to an enormous size, the teeth get loose, the tumor softens in one or more places, bursts

and discharges a gelatinous yellowish white matter, containing little yellow masses or clusters of the fungus about the size of grains of sand, which are cheesy in consistency. When the swollen bone is cut across, it is found to be softened in spots with hard bony matter surrounding them like a honey-comb. The tongue usually swells and becomes very hard, hence the name *woody tongue*, which is often applied to this condition. This makes it very difficult for the animal to eat or drink. The glands around the throat, when affected, swell, burst and discharge, the same as the jaw bones, and present somewhat the same honey-comb condition when cut into, but are often seen to contain one or more large abscesses instead of many small ones.

What to do.—The treatment is of three kinds, viz.: preventive, surgical and medicinal. Prevention is effected by keeping affected animals away from the healthy ones, not allowing them to go into the fields, yards or stables used for other stock for any purpose. Never take an affected



ACTINOMYCOSIS OF THE
UPPER JAW.



BAD EFFECTS OF EXCESSIVE
USE OF CAUSTICS.
A large hole through the cheek into the
mouth from excessive use of caustics.

animal into a healthy herd. This has been done in some cases without apparently bad results, but many cases have been seen by the writer and others to have developed and spread extensively from one introduced from a distance with a nonsuppurating tumor under the jaw the size a hen's egg at the time of purchase, which grew, burst and discharged a little later, and which was followed in four to six weeks by the disease in many others of the herd.

Surgical treatment consists in opening the tumors freely with a knife, emptying the sacks, and packing them thoroughly with cotton dipped in tincture of iodine. The packing needs to be removed once every two days, till the tumor begins to shrivel; or the tumor may be dissected completely out, but this is often a dangerous operation, owing to the size or location of it. If the jaw bone is involved it is more serious and the treatment is often a failure, but many successes will follow heroic surgery. Gouge and chisel out the diseased bone as completely as possible and pack

the cavity with iodine the same as in the soft tumors, or a twenty-five per cent. solution of hydrochloric acid might be used for a few days instead. When the disease seems to be under control stop the packing and dress the wounds with a solution of carbolic acid—a tablespoonful to a pint of tepid water, two or three times a day.

Medicinal treatment consists in giving to each affected animal one dram of iodide of potash three times a day in solution in soft feed till the effects of the drug are visible in the production of slavering at the mouth, loss of appetite or scurfiness of the skin, then stop it for a week or ten days and repeat. This condition will develop so as to be seen usually in ten or twenty days. A couple of months or so of this dosing will usually cure all of those affected in the soft tissues. The above dose is proper for a three year old steer weighing fourteen hundred pounds; smaller and younger ones should get proportionate doses. As soon as an animal shows signs of having the disease he should be isolated and kept there till cured or destroyed.

The meat of cattle affected with this disease should not be used for food.

X. Contagious Abortion of Cattle.

This is a disease with which every cattle raiser and dairyman should be acquainted, as it is liable to be introduced into his herd, and a failure to recognize and deal with it intelligently may result in considerable loss. Such loss occurs not only through the death of the offspring but through a diminished milk production.

Abortion, sometimes known as "slinking," "casting," or "losing" the calf, is the term given to the expulsion of the fetus at any time before the completion of the full term of normal pregnancy. While it may be produced in many ways, as by an injury, improper food or treatment, etc., by far the greater number of cases is due to one of several germs and are known as contagious abortions. Nocard in France and Bang in Denmark have found bacteria, and the Scottish commission found as many as five separate kinds which produce the disease. In this country V. A. Moore, of the New York Cornell Station, and F. D. Chester, formerly of the Delaware Station, have found organisms differing somewhat in the two States, but evidently of the same group with the colon bacillus. Dr. James Law concludes that any micro-organism which can live in or on the lining of the membrane of the womb, producing a catarrhal inflammation, and which can be transferred from animal to animal without losing its vitality or potency, is of necessity a cause of contagious abortion. The disease is transmitted from one animal to another by contact, by means of the discharge from the cow that has aborted, the afterbirth, dead calf, and from bull's that have served cows affected with the disease.

It appears to be more or less prevalent throughout the country. Dr. Leonard Pearson, state veterinarian of Pennsylvania, in his report for 1906 states that abortion was never so prevalent as it is to-day. Doctor Barnes, of the Kansas Station, reported the disease to be quite common in Kansas in 1906, and Professor Wilson, of the Arizona Station, reports it to be present in a number of herds in that State.

The disease occurs more frequently in dairy herds than in any others, although beef cattle, sheep, horses, and goats may become infected. The prevalence of this disease in dairy herds is probably due to the weakened condition of dairy cows caused by the continuous drain of giving milk. Recent reports from the Storrs and New Mexico stations discuss its occurrence and eradication from the station herds.

At the Storrs Station the disease was introduced into the herd through the purchase of six pure-bred pregnant animals, two of which aborted shortly afterward. During the next three years 24 of the 79 calvings were premature births. This indicates that the contagion was not extremely virulent or that the treatment delayed to some extent the progress of the disease.

The premature births occurred at from 145 days to 262 days from time of conception, and the average of the 24 cases was 211 days. The bull was not the sole means of spreading the disease in this instance. The 24 conceptions that terminated in premature births were the result of the matings of 15 different sires, eight of which were owned by parties remote from the affected herd.

At the Arizona Station the disease appears to have been originally communicated by the herd bull. Five cows aborted in the farm herd, of which four were sold for beef and one retained for experimental purposes. Under strict sanitary conditions this cow was served by the herd bull and in due time dropped a living calf. A number of cows have since been served by this bull without signs of abortion.

At the Storrs Station, in order to determine the value of aborting cows as milk producers, the milk and fat yields of ten cows following a normal calving are compared with the milk and fat yields during the period of abortion.

These cows, following a normal calving, averaged 5,892 pounds of milk and 282.8 pounds of fat in one year. During the next 2.1 years, or from one normal calving to the next normal calving, which included the aborting period, these cows averaged 5,196 pounds of milk and 268.4 pounds of fat per year. The milk was 696 pounds, or 12 per cent less per year during the aborting period. These ten cows aborted seven months (averaged 211 days) after conception. The satisfactory yields are attributed in part to the complete removal of the afterbirth and the thorough disinfection of the animals after abortion.

In regard to the potency of animals which have aborted, Professor Beach reports as follows:

Only one of the twenty-four animals that experienced a premature birth failed to breed after aborting. This animal was killed and the post-mortem examination showed the presence of an ovarian tumor which may or may not have been caused by the treatment administered to induce conception. Twenty-three of these cows produced a normal calf 461 days subsequent to abortion. * * * Experience indicates that it is useless to attempt to breed a cow for four or five months subsequent to aborting. Time must be given to recuperate. The success in getting these cows in calf after the premature delivery is attributed in part to the use of the yeast treatment. A yeast cake dissolved for twenty-four hours in a pint of warm water was injected into the vagina several days in succession previous to the time of mating.

The following advice as to preventive treatment and remedial measures is given by Professor Wilson:

It is well to call some competent veterinarian, in a case of contagious abortion, so that the farmer may learn the need of careful work in cleaning all infected places, and, also, the technique regarding the use of the syringe. After a few trials this manipulation becomes easy and he will soon learn to employ the necessary care in keeping this disease in check. * * * All cows that have aborted or that are suspected should be isolated from healthy animals. Just as soon as a cow aborts the offspring and afterbirth should be destroyed by burning and the immediate surroundings treated with lime after the trash has been removed and burned; all woodwork should be thoroughly disinfected by the use of corrosive sublimate. This can be obtained, with directions for use, at any drug store. A second disinfection with corrosive sublimate should take place ten days later. * * * Cows that have aborted should be washed out daily with a 1 per cent solution of creolin or lysol until all discharge is stopped. It is somewhat risky to use this treatment with pregnant cows, but in this case a tablespoonful of sodium hyposulphite, once in twenty-four hours, should be given as a drench. All of these, with directions for using, may be obtained at nearly any drug store.

During the past few years Prof. Bernard Bang, of Denmark, has carried on experiments in attempting to immunize cows, sheep, and goats against the disease. He has observed that aborting cows acquire a certain degree of immunity. His treatment produced abscesses and other symptoms of reaction, but considerable immunity resulted, and he hopes that this method of vaccination will ultimately give a means of controlling the disease.

CHAPTER III.

NON-CONTAGIOUS BLOOD DISEASES.

I. PLETHORA.—II. ANAEMIA.—III. RHEUMATISM.—IV. URAEMIA.—V. SEPTICAEMIA AND PYAEMIA.—VI. PURPURA HEMORRHAGICA.—VII. HAEMATURIA, OR RED WATER IN CATTLE.—VIII. MALIGNANT CATARRH.—IX. MALIGNANT SORE THROAT.

I. Plethora.

This, which may be described as an over fat condition of the blood, is conducive to many very serious results by interfering with the circulation, especially that through the vital organs, rendering them inert and unable to eliminate from the system the effete material which, at such a time, exists in increased quantities. These impurities, left in the system, lead to blood poisoning, and to excessive congestions and inflammations in case of disease, thus greatly enhancing the dangers attending disorders of all kinds.

Causes.—It is caused by rich, stimulating food, such as oil-cake, corn and other grain, roots, and too succulent green food and pastures,—in fact, anything that fattens very fast.

How to know it.—Unusually rapid improvement, exuberant spirits, sleek hair, loose skin, and tendency to fatten very fast. Occasionally, slight fever may be seen, at first of short duration, but increasing with each attack till violent congestion occurs, followed by inflammation; and death supervenes after a run of very high fever, or suddenly during the congestive stage.

What to do.—Deplete either by bleeding or purging. Take from two to six quarts of blood, or give a few doses of salts, in quantities of a single handful, morning and night for a week, at the same time removing to less luxuriant pasture, or curtailing the meal. The restricted diet and salts are preferable to bleeding.

II. Anæmia.

Causes.—This condition, the reverse of plethora, is seen when the animal is thin in flesh from lack of sufficient or proper kinds of food, especially when this is accompanied by exposure to the weather or impoverishment by parasites. It is apt to lead to purpura hemorrhagica, rheumatism, etc., and always predisposes to lice or other vermin.

What to do.—Destroy any existing vermin, and give the following recipe in the feed :

No. 4. $\frac{1}{2}$ Ounce copperas,
 1 Handful oil-cake,
 Powder and mix.

Give as one dose. Repeat it morning and night, and let the diet be a nourishing, generous one.

III. Rheumatism.

Causes and forms.—The immediate cause of rheumatism is the accumulation in the system of a peculiar kind of acid, which has a tendency to settle around the joints, along the sheaths of tendons, and in the synovial membranes. In the acute form, which is that which it generally assumes, the affected parts swell, and often suppurate, discharging considerable quantities of pus, and with it more or less synovial fluid. It often extends to the bones and the membranes covering them, when it generally becomes chronic, and more or less exostosis is thrown out, which may ankylose (stiffen) the joint. Rheumatism frequently extends to the chest, and settles in the pleura, heart, etc., and sometimes causes diseases of the latter organ and death.

The exciting causes are poverty of the system, thinness in flesh, and exposure to cold and dampness,—to the two last-named either from want of shelter or from dampness in the stable caused by poor drainage.

How to know it.—There is lameness, stiffness, and disinclination to move, with a staring coat. After this has run on for a few hours, (or, it may be a day or two,) a joint—perhaps, two or three joints—will begin to swell, and is found to be quite hot, hard and painful; next morning the swelling will very likely be noticed in some other joint or in another leg, as the disease has a great tendency to fly from joint to joint and leg to leg. There is considerable fever, with high pulse, increased temperature, reddened mucous membranes, and a marked inclination to remain lying down all the time. The bowels are apt to be constipated, and the urine scanty and high colored. Abscesses form and discharge pus. The animal becomes emaciated, and frequently dies in a state of hectic.

What to do.—Put the animal in a dry, warm place to lie in, with plenty of bedding. Give generous diet and the following recipe :

No. 5. 2 Drachms colchicum,
 2 Drachms nitrate of potash,
 Mix.

Give as one dose, and repeat it morning and night in soft feed, for a week; then give No. 4 for a week, and change back to No. 5. Alter

nate them in this manner for a month. As local treatment, apply the following to the joints :

- | | |
|--------|--|
| No. 6. | 1 Ounce laudanum,
1 Ounce spirits of camphor,
1 Ounce turpentine,
Water to make one pint,
Mix. |
|--------|--|

Apply three times a day, with friction, and bandage. If great weakness ensues, give the following :

- | | |
|--------|---|
| No. 7. | 1 Ounce gentian root,
$\frac{1}{2}$ Ounce ginger,
1 Quart oat meal gruel,
Mix. |
|--------|---|

Give as one dose, and repeat three times a day for two weeks.

IV. Uræmia.

In this disease, in consequence of the kidneys and bladder being out of order, the urine is absorbed back into the system, causing a peculiar poisoning of the blood, from an excessive accumulation of urea.

How to know it.—Dullness, loss of appetite and failure to secrete urine ; the mouth and nose are dry, and the former is foetid ; rumination ceases, the coat stares, and a smell of urine is detected on the skin ; pulse and respirations become slow, and the former is also soft ; the pupils are dilated, and, too often, delirium, coma and death close the scene.

What to do.—Examine all parts carefully, in order to ascertain the cause, and then treat vigorously to remove it. Give large quantities of linseed tea to drink and, as a mild purgative, the following :

- | | |
|--------|---|
| No. 8. | 12 Ounces epsom salts,
1 Ounce ginger,
1 Ounce gentian,
4 Ounces syrup,
Water to make two quarts.
Mix. |
|--------|---|

Give as one dose. After it has operated, give a tablespoonful of saltpetre, three times a day, for two days.

V. Septicæmia and Pyæmia.

This is a condition resulting from the absorption into the system of putrid, poisonous matter, or pus, especially that from an ulcer or suppurating surface.

How to know it.—There will be a high fever, with increased temperature ; pulse is fast and hard, and breathing quickened ; the breath is foetid ; rumination is suspended ; there is loss of appetite, staring coat, and emaciation, and in fatal cases, delirium.

What to do.—Discover the cause if possible, and if it is a sore of any kind containing pent up pus, (the most common cause), liberate it and dress the wound with the following lotion :

No. 9. $\frac{1}{2}$ Ounce carbolic acid.
1 Pint water,
Mix.

Apply two or three times a day with a syringe, if there are passages ; if the sore is on the surface, bind on a sponge wet with the lotion. If there is an ulcer, treat it as prescribed in the next article. Give the following mixture :

No. 10. 2 Drachms iodide of potash,
2 Ounces whiskey,
1 Ounce powdered cinchona,
1 Pint gruel,
Mix.

Give as one dose, repeating same three times a day, and feed liberally.



HEAD OF COW WITH FOOT
AND MOUTH DISEASE.

VI. Purpura Hemorrhagica.

This is a specific blood disease quite common in the horse and pig, but rare in cattle. It originates in an impoverished condition of the system, more especially the blood, which becomes deficient in red corpuscles, fibrin, etc., and oozing through the coats of the vessels, falls by gravitation to the more dependent portions of the body, causing swellings of the legs and belly, and also of the head, beginning with the muzzle and gradually working up till it reaches the brain. For an extended description

of this disease the reader is referred to the account given in the Horse department of this work,—Chapter XIII., of Part II.

What to do.—The system needs to be toned up, the blood improved, and swellings fomented in hot water. Foment the head especially, as continuously as possible, and give the following recipes:

- No. 12. 1 Ounce oil of turpentine,
 $\frac{1}{2}$ Pint linseed oil,
 Mix.

Give as one dose; repeat three times a day, for two or three days.

- No. 13. $\frac{1}{2}$ Ounce tincture muriate of iron,
 1 Ounce tincture of cinchona,
 2 Ounces water,
 Mix.

Give as one dose; repeat three times a day, giving it in between the doses of No. 12. As to food, give whatever the animal will eat.



SWELLING OF THE JAWS,
CHEEKS AND MUZZLE, IN
PURPURA HÆMORRHAGICA.

VII. Hæmaturia, or Red Water in Cattle.

As the name implies, this is a blood disease. Large quantities of albumen and some iron are secreted by the kidneys and excreted with the urine, which looks as though it were colored by blood, beginning, as it does, in a pale pink color, and running through the different shades till it becomes a dark brown. Really, there is no blood in it; the appearance in question is due to the presence, in excessive quantities, of albumen and iron and the coloring matter of the blood. As the secretion of the two former increases, the color darkens. There are also discharged numerous epithelial cells from the mucous membrane of the kidneys and bladder. The blood undergoes a change; the cells or corpuscles break, and let their contents escape into the *liquor sanguinis*, and hence the commingling of the coloring matter of the blood with the urine.

Causes.—These are obscure, but seem to depend in some way upon the food. Most commonly seen in cattle pastured in low, swampy lands, the disease disappears in such cases when the land is drained.

How to know it.—In addition to the color of the urine, a characteristic feature is the great increase in its quantity. It may run on for two or three weeks without apparent damage; then the milk will fall off both in quantity and quality; emaciation sets in; the bowels at the outset may be loose, but soon become obstinately constipated; the pulse gets quick and weak; the cow blows more and more, from increasing weakness; at the left side the heart may be heard to palpitate with quite a perceptible noise, owing to the watery condition of the blood; the debility and anæmia rapidly increase, and death soon follows.

What to do.—Give a purgative recipe, No. 8, and follow it with recipe No. 4. Continue the latter for three or four weeks. Make a complete change of food, and feed liberally on oil-cake, etc.

VIII. Malignant Catarrh.

In this malignant blood disease, the sinuses of the head are affected, causing offensive discharges from the nose. These, at first, are watery, but further along become purulent, and in the last stage are accompanied with extensive sloughing.

How to know it.—It is ushered in with a shivering fit, with all the attending symptoms of fever; the muzzle is hot and dry; the animal hangs his head and isolates himself in the pasture; the membranes are of a bluish color; the eyes are closed and swollen; soon the nose and eyes begin to run a watery fluid, and saliva drools from the mouth. The pulse is quick and not over strong; a dry, hard cough ensues; the bowels are usually costive, the fœces being black and hard, but diarrhœa is liable to set in at any time. There is great thirst, but no appetite, and the urine is scanty and high colored. In the course of twenty-four hours, the discharges become purulent, taking off the hair wherever they touch; the sinuses of the head become so much inflamed, and so filled up with pus, that when the head is tapped on the outside with the fingers, a dull heavy sound is heard. The breath becomes fetid, and the temperature rises to 104° or 105° . Cows with calf are apt to abort.

The last stage is marked by extensive sloughing, so much so that sometimes the feet and horns come off. The prostration is very great; the pulse becomes imperceptible; convulsions follow, and a great fall in temperature, sometimes to 95° , or even to 90° ; in some cases, ulceration of the cornea takes place, letting out the humors of the eye. Death follows in the course of nine to eleven days. On post mortem examination, the blood is found to be black and not coagulated.

What to do.—Remove to a cool isolated place, if in summer; to a warm place, if in winter. Give recipe No. 8, and follow it with Nos. 10, 11 and 4, alternating them. Foment the head with hot water liberally, and rub the following liniment well in once or twice a day:



MALIGNANT CATARRH—LAST STAGE.

Showing extensive sloughing, and discharge of the humors of the eye, from ulceration of the cornea.

- No. 14. 1 Ounce linseed oil, 1 Ounce oil of turpentine,
1 Ounce liguor ammonia, Mix.

Apply the following lotion to the eyes, if not eaten through:

- No. 15. 10 Grains nitrate of silver, 1 Ounce water, Mix.

Apply twice a day to the cornea with a camel's hair brush. If the cornea is punctured, touch it once a day with a stick of lunar caustic, in addition to using lotion No. 15. Touch the caustic directly to the hole in the cornea.

IX. Malignant Sore Throat.

This is a disease that centers itself in the throat, in the form of acute inflammation, followed by an effusion that is apt to cause suffocation by pressure on the larynx. Its scientific designation is *œdema glottidis*. It is fatal to cattle; also to swine, in which it is known as quinsy. The malignant sore throat of anthrax is a different thing, though many of the symptoms are similar.



MALIGNANT SORE THROAT.

How to know it.—It starts like a common cold,—some fever, injected mucous membranes, cough, etc.; the throat swells enormously; the

tongue becomes spotted with purple, and is protruded; the animal gasps for breath, until at length he falls suffocated, struggles a little, and dies.

What to do.—It usually attains its height in three or four days. Apply recipe No. 14 to the throat, externally, and inject a little of the following well back into the throat, several times a day:

- No. 13. 1 Ounce chlorate of potash,
1 Pint water,
Mix.

If speedy suffocation is threatened, tracheotomy must be performed. (See "Operations.")

The flesh of cattle affected with this disease is very poisonous, causing putrid fever in those eating it. The carcass should be buried deep, without removing the skin.

Cornstalk Disease:—This is a disease peculiar to parts of the United States, particularly in the west central part. It comes on without apparent warning and no satisfactory treatment is at hand. Prevention is the main thing and recommendations are made here. Salt the cattle regularly and have plenty of good water to drink. Do not let them depend exclusively upon the stalks, but give them a run to alfalfa or some other kind of hay. If the disease is at all suspected give to each one in his drinking water, once a day, a teaspoonful of hyposulphite of soda and sulphate of quinine in the proportion of eighteen parts of the former to one of the latter. Provide a shed for them to sleep under, especially when there is great extremes of temperature between the night and the day.

Sorghum poisoning:—Give molasses, milk and fresh air.

CHAPTER IV.

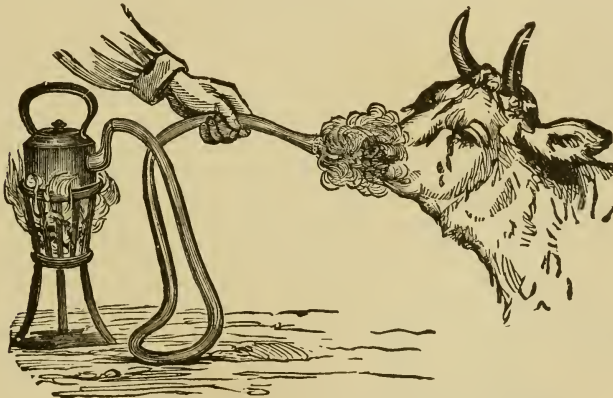
DISEASES OF THE RESPIRATORY ORGANS.

- I. SIMPLE CATARRH OR COLD.—II. LARYNGITIS, OR COMMON SORE THROAT.—
III. BRONCHITIS.—IV. PNEUMONIA.—V. PLEURISY.—VI. HYDROTHORAX
—VII. EMPHYSEMA OF THE LUNGS.

I. Simple Catarrh or Cold.

Simple cold or coryza, is inflammation, more or less acute, of the mucous membrane lining the nostrils and sinuses of the head, usually implicating the eyes and throat. If neglected, it is apt to run down to the lungs, and cause bronchitis and pneumonia.

Cause.—Damp, badly drained stables, and those built so as to allow drafts; exposure to storms and winds; sleeping on the ground in cold weather, etc.



APPLICATION OF STEAM TO THE NOSTRILS WITH THE JET.

How to know it.—There is more or less fever, with fits of shivering; hot mouth, dry nose, and horns hot at the head and cold at the tips; ears and extremities cold; sneezing, and sometimes a cough. At first, watery mucus discharges from the nose; the eyes are red and inclined to weep, with the eyelids swollen; and the bones of the forehead are hot and tender when tapped. After a day or two, the discharge from the nose becomes purulent, and the tears begin to scald the cheek; the

coat stares; the pulse is rapid and rather hard; the appetite fails, and rumination ceases; the urine is scanty and high colored, the bowels very likely being constipated. All these symptoms will be aggravated, should the fever run very high and the inflammation tend decidedly to run down the air passages.

What to do.—Remove the cause, by putting the animal in a comfortable, dry place. Give a pint of melted lard, if the bowels are constipated; if too loose, give the following:

- No. 17. 1 Pint infusion of quassia,
 1 Ounce laudanum.
 $\frac{1}{2}$ Ounce sulphuric ether,
 1 Pint thin gruel, cold,
 Mix.

Give with a bottle as one dose; repeat it after six or eight hours, if necessary. But begin on a fever mixture, as follows:

- No. 18. 3 Ounces spirits of nitre,
 2 Drachms tincture aconite root,
 $\frac{1}{2}$ Ounce fluid extract of belladonna,
 2 Ounces nitrate of potash,
 2 Ounces muriate of ammonia,
 Water to make one quart,
 Mix.

Give half a teaspoonful every two or three hours till better. Rub mustard paste well in to the throat and over the forehead between the



NOSE-BAG FOR STEAMING.

eyes. If the breathing is interfered with, steam the head in a nose-bag, or with a hose from the snout of a kettle, or over a tub with a blanket thrown over the head to confine the steam, the object being to soften the discharge and make it run off. This may be repeated several times a day if necessary, taking care, in using the steam jet, to avoid scalding or suffocation. Let the animal have all the water he desires, placing it before him, so that he may help himself. Feed on soft, sloppy food. When the fever is broken, the appetite being good, give the following recipe in the food:

- No. 19. 2 Drachms nitrate of potash,
 2 Drachms gentian root, powdered,
 1 Drachm ginger,
 Mix.

Give as one dose, repeating it morning and night for about a week

If the appetite is too poor to take it thus, give the following from a bottle :

No. 20.	$\frac{1}{2}$ Pint infusion of gentian,
	1 Drachm ginger,
	1 Drachm carbonate of ammonia,
	2 Ounces syrup,
	$\frac{1}{2}$ Pint water,
	Mix.

Give as one dose. Repeat it three times a day, till the appetite is good enough to take No. 19 in the feed. When the fever has left entirely, give the following in soft feed, a bran mash or oat meal, morning and night :

No. 21.	3 Drachms sulphate of iron (copperas),
	2 Drachms gentian,
	1 Drachm ginger,
	1 Drachm fenugreek seed,
	Powder and mix.

Give as one dose, twice a day for a week or two.

II. Laryngitis, or Common Sore Throat.

This is, as the name indicates, an inflammation of the larynx or upper part of the windpipe. It is dangerous on account of the interference to the breathing which is caused by the swelling, and also its tendency to run down to the lungs.

Cause.—It is usually brought on by the same influences as a common cold. Some animals appear predisposed to it, almost every slight exposure being sufficient to induce an attack.

How to know it.—There is inability to eat, and the cud is not chewed; the head is hung, the ears droop, and saliva drools from the mouth; upon examination, the throat is found to be much swollen, and if the finger be inserted under the tongue, the mouth is hot. The pulse is raised and breathing quickened; if the tumefaction is very great, especially on the inside, the breathing may also be labored. There is more or less fever, and when water is drunk some of it is likely to come back through the nose, owing to the difficulty of swallowing.

What to do.—Rub mustard paste in well on the throat; after an hour wash this off and rub in more; if after two days the swelling does not come down, apply to it a linseed poultice, hot and soft, to encourage suppuration. Dissolve a table-spoonful of saltpetre in the water drunk morning and night, and with a



LARYNGITIS OR SORE THROAT.

syringe shoot a little of the following mixture well back into the throat, as a gargle, several times a day :

No. 22.	2 Ounces chlorate of potash,
	1 Quart water,
	Mix.

As additional treatment, a severe case might require tracheotomy. (See "Operations.") Any of the mixtures prescribed for catarrh in Section I, might also be used.

III. Bronchitis.

This is inflammation of the mucous membrane lining the bronchial tubes, which extend from the lower end of the windpipe to the lungs.

Causes.—It may develope as the immediate consequence of exposure, accompanying a common cold, or it may arise from the extension of the inflammation in laryngitis or catarrh; from medicine or food going down the windpipe; from inhaling hot air or smoke.

How to know it.—There will be rapid, painful breathing, with a slight grunt at each expiration; a deep, hard, distressing cough; after it has run a few hours, considerable fever will be noticed; the pulse will be soft and full, ranging in different cases from fifty to eighty per minute; the temperature from 103° to 106°, as indicated by a thermometer inserted in the rectum; and while the surface of the body, nose, horns near the head, and mouth will be hot, the tips of the horns, ears and legs are very likely to be cold. The sufferer will not lie down. When the ear is placed to the sides and front of the chest, a dry, grating sound can be heard. After two or four days, the height of the disease will be reached, when the cough will get softer, the pulse softer and weaker, the temperature of the body more even, and when the ear is applied to the chest a mucous rale is heard, like air gurgling through water. Considerable mucus and phlegm are now raised with the cough, and when the sides are tapped a resonant sound is got, but not quite so distinct as in health. In a favorable case (which is what we are considering), at the end of five to eight days the fever subsides, the pulse gets fuller and stronger, the respirations are less rapid and painful, the cough diminishes, the mucus in the bronchial tubes is absorbed, and the appetite and normal discharge of the functions generally are restored, when he may be pronounced safely convalescent. If, however, it goes against him, the temperature increases, and all the symptoms are aggravated; before long, the inflammation extends to the lungs and pleura, and then we have a case of pneumonia or pleurisy and hydrothorax on hand.

What to do.—Put him in a warm place with good ventilation, and if the disease is in the first stage, that of congestion, give the following:

No. 23.	2 Ounces Mindererus' spirit (acetate of ammonia),
	20 Drops tincture of aconite root,
	½ Pint of water,
	Mix.

Give as one dose. Repeat it every two hours till the chill is over and the pulse reduced to soft, instead of being hard; then change to No. 18, which should be continued till convalescence is well established. Then change to No. 20, and after a few days to No. 21. Early and vigorous application of mustard paste to the sides is very important. Allow all the water to drink he will take, and feed on soft food.

IV. Pneumonia.

This is inflammation of the lung tissue—that is, of the lung itself. A severe cold (catarrh) may develop rapidly into this form, but it is oftener the sequel of laryngitis, bronchitis, etc., from their inflammatory conditions extending to the lungs. It is more common among cattle than any other domestic animals, and may affect one or both lungs.

How to know it.—The animal shows obvious preliminary symptoms, such as a severe shivering fit, staring coat, loss of appetite, cessation of rumination, and, if a milch cow, loss of milk. She is very averse to lying down, owing to the increased pressure it would cause upon the chest, thus augmenting the pain and difficulty in breathing. The pulse is full, soft and quick, ranging from 60 to 80 per minute; respirations from 30 to 40 per minute; and the temperature about 104° to 106° . When the sides are tapped, a dull, heavy, full sound is heard, and on placing the ear to the side there will be noticed an absence of the respiratory murmur in all affected parts; the expired air is hot; the ribs are fixed, the breathing being done by the abdominal muscles; the flanks heave, the nostrils are dilated, and the countenance has an anxious look. The lung becomes more or less hepatized (solid like liver), and this may terminate in resolution by absorption of the infiltration, and complete recovery follow, or it may go on to suppuration, with discharges of pus through the nose, which soon carries the patient off. Death may take place in any of the stages, viz: congestion, or first stage; hepatization, or second; or in suppuration, or third stage.

When the lung becomes solid, the cow braces herself and pants furiously, heaving the flanks as though each breath would be the last. If the head is raised quickly, she will fall backwards. When she has to fall finally, she drops first upon her knees and chest, and then down, and dies in a few minutes. On post mortem examination the diseased lung will be found to be solid from the exudations within the interlobular will be found to be solid and marbled in color.

When gangrene has taken place, which may occur before death, that part of the lung will be of a bluish black color, while the rest of the organ will be more of a dark brownish purple.

In case of abscess of the lung, there is a slow pining away, and death in an emaciated condition.

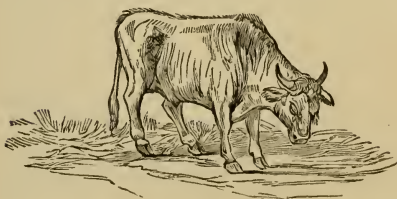
What to do.—The same treatment prescribed for bronchitis will answer in this case. Bleeding is not to be thought of, except in the very first stage, that of congestion, as, later, its weakening effects render it decidedly objectionable. If a fair chance is given the patient, recovery is probable in most cases, and although it sometimes leaves the wind hurt by the permanent solidification of a lung or part of a lung, this, in cattle, is a matter of small consequence.

V. Pleurisy.

Pleurisy is inflammation of the pleura, which is the serous membrane lining the cavity of the chest and investing the lungs. Of itself it is not fatal, but inflammations of all serous membranes are prone to abundant effusions, and the effusion following pleurisy is excessively great. It is called *hydrothorax* (water in the chest), and always indicates a very critical case.

Cause.—It is caused by exposure to cold storms, winds, etc., the same as other diseases of the breathing apparatus. Cattle seem to be particularly subject to it.

How to know it.—There is more or less fever; the pulse is quick, small and hard, and inclined to be wiry; the breathing is quick and painful; the elbows are turned out; the ribs are fixed, and the breathing done by the abdominal muscles; there is a crease, running from the elbows along the ribs towards the flanks, where the ribs join the cartilages of the chest. The inspirations are short and imperfect, but the expirations are prolonged and more easily effected. Pressure between the ribs causes intense pain and a grunt, and on applying the ear to the sides a grating, rasping sound is heard, like rubbing dry sheep skin together. The head is hung low, the ears droop, the nose is dry, and though the



ACUTE PLEURISY.

eyes are partly closed, the countenance wears an anxious look. Rumination stops, the appetite is lost, the flanks are tucked up, there is a hacking, painful cough, and the animal remains standing, with evident disinclination to move.

There are sharp, shooting pains through the chest, that make the animal turn his head around to his sides. Unlike pneumonia, percussion on the ribs produces a clear,

resonant sound, the expired breath is not hot, the nostrils are not dilated, and there is no mucous rale. Pleurisy may terminate in resolution by absorption, etc., the patient getting well very quickly, without any ill effects, or it may go on to the stage of great effusion, and terminate in hydrothorax.

What to do.—If taken right at the start, give recipe No. 23, but if the fever is far advanced give No. 18. When the fever is subdued, give No. 20, if the appetite is poor; if it is good, give No. 19. During convalescence give No. 21. Apply mustard paste to the sides assiduously.

VI. Hydrothorax.

As explained in the last section, when the chest fills with water from the excessive effusion of pleurisy, it is called Hydrothorax.

How to know it.—As soon as the effusion begins, all pain ceases, respiration is deeper, longer, and less painful, the belly drops, the elbows no longer turn in, the appetite returns, the eyes get bright, and to a casual observer, the animal appears to have taken a decided turn for the better; but in a very short time the practiced eye discovers unfavorable symptoms, such as flapping of the nostrils, a quick, labored breathing, and heaving of the flanks. The legs and chest become dropsical, the eyes sparkle, and the countenance resumes its anxious look. No respiratory murmur or other sound is heard by the ear, when placed to the side—none at least at the bottom—though, later, a splashing may be heard when the water reaches the heart; percussion on the ribs elicits a full, dull sound; the pulse becomes rapid but small, and gradually fades away until imperceptible. Death occurs from suffocation. Post-mortem examination reveals the chest filled with water, and shreds of lymph clinging to both the lungs and ribs.

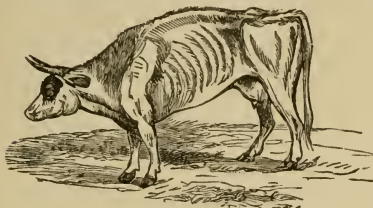
What to do.—If the sides are not thoroughly blistered from the mustard previously applied, apply fly blisters energetically, to get up a great amount of vesication (skin blistering), and give the following recipe:

- | | |
|---------|------------------------|
| No. 24. | 2 Drachms gum camphor, |
| | 4 Drachms saltpetre, |
| | 1 Ounce spirits nitre, |
| | 1 Pint water or gruel, |
| | Mix as directed below. |

The camphor must be dissolved in the nitre, and then the saltpetre and water (or gruel) added. Give as one dose, and repeat it every four or six hours. Give ale, porter, etc., in liberal quantities. It is advisable to tap the chest early, repeating it if necessary. (See chapter on operations.)

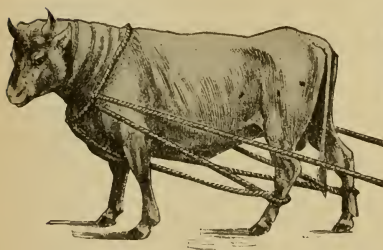
VII. Emphysema of the Lungs.

This is a condition of the lungs very apt to mislead the inexperienced, there being few signs other than negative ones. The milk is noticed to be diminishing, and the cow falling off in flesh; the coat is staring and dirty, and hide-bound exists; the bowels are irregular, and the appetite poor; still, the mouth and nose are cool and moist, and the breath is sweet. The head is carried low; the back is arched, and tender on pressure; and there is weakness in

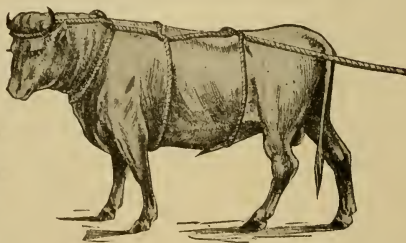


EMPHYSEMA OF THE LUNGS.

walking. The temperature falls below the normal standard, and so does the pulse. Later, the ears and extremities become deathly cold, rumination ceases, and an uncontrollable, offensive diarrhœa sets in; the back arches more and more; the belly is tucked up; milk entirely stopped, the udder and teats being soft and flabby; the legs are spread to avoid falling; the pulse gets smaller and weaker, though not much faster; the appetite all gone, weakness becomes excessive; and death follows, after progressive symptoms running over a period of two months or more.



DEVICE FOR CASTING CATTLE.



ANOTHER DEVICE FOR CASTING CATTLE.

The post-mortem reveals ruptured air-cells, and extensive emphysema of the lungs. Very few blood vessels are found owing to so many having been absorbed when the circulation became so weak as to allow the smaller vessels to collapse and become obliterated. The right ventricle of the heart is weak and thin, and contains a portion of a clot.

CHAPTER V.

TUBERCULOSIS, CONSUMPTION OR WHITE PLAGUE.

I. ANIMALS SUSCEPTIBLE TO TUBERCULOSIS.—II. ANIMALS EXEMPT EXCEPT BY INOCULATION.—III. PREDISPOSING CAUSE OF TUBERCULOSIS.—IV. TUBERCULOSIS IN CATTLE.—V. TUBERCULOSIS IN ADVANCED STAGE.—VI. SIGNS OF GENERALIZATION OF THE TUBERCLE.—VII. GENERATIVE TUBERCULOSIS.

This is an infectious disease common to man and to a large number of animals caused by the bacillus tuberculosis. This disease prevails to an extent which may be said to apply almost to everything having life or vital energy. It is characterized by productive inflammation giving rise to small rounded bodies called tubercles.

I. Animals Susceptible to Tuberculosis.

Among animals susceptible to tuberculosis are reptiles, fishes, birds, rats, dogs, apes, monkeys, deer, elk, antelope, gazelle, camel, dromedary, giraffe, kangaroo, lion, tiger, jackal, jaguar, bear, arctic-fox, common cage birds, as well as birds of the farmyard, hens, turkeys, ducks, pigeons, cats, goats, sheep, swine, cattle and horses. It is one of the universal plagues; but modern science has discovered practical elimination by prevention where it does not exist and cure where it has not made too much progress.

II. Animals Exempt Except by Inoculation.

The horse, the ass and the mule rarely contract tuberculosis except by inoculation. By inoculation the horse readily succumbs to infection. Generalization with the horse takes place more certainly than with the ox. The spacious stall of the horse, his outdoor life, his hard, muscular exercise, the relatively small tonsils, the exclusive nasal respiration and the paucity of connective tissue lymph plexuses, and the abundance of red globules combine to favor immunity from this disease. Yet the horse is susceptible to it and the disease once established is liable to advance more rapidly to a diffuse generalization. The lesions in the lungs and abdominal cavity resemble those of cattle both in nature and abundance where infection exists; tubercles polypi, ulcers are more common, the visceral lymph glands are early and severely attacked; the liver and spleen suffer extensively, the serosæ somewhat less so; lesions have been noted in the vertebrae, skin and muscles. In rare instances tubercles have been seen in the heart.

Man has long been recognized as standing in the front rank of susceptibility to tuberculosis. Yet, even in his case, the prevalence of the affection bears an intimate relation to his outdoor life. What is true of man is equally true of horses. The horse in his wild state is free from tuberculosis.

III. Predisposing Cause of Tuberculosis.

A predisposing cause is close buildings, a lack of ventilation. Air rendered impure by being breathed again and again predisposes strongly to tuberculosis, and has been even looked upon as the primary cause. Dark stables are usually close, dirty and damp, and all these conditions conduce to tuberculosis. Darkness hinders the development of organic coloring matter in living bodies, whether chlorophyll in plants or hæmoglobin in the blood of animals. Hæmoglobin is the main oxygen carrier in the blood, and in case of its deficiency the tissues are not properly aerated. The result is as if the inhaled air contained little oxygen, so that darkness further intensifies the evil of rebreathing deoxygenated air. The extraordinary mortality from tuberculosis among prisoners, monks, nuns and miners, serves to further accentuate this conclusion.

Insufficient feeding, indigestion, or in-nutritious food, contribute to debility and lessen the power of resistance. Hence, in poor, half starved animals when once introduced it makes rapid and extensive ravages. Conversely, over-feeding will act in the same way, developing indigestion and thereby robbing the tissues of their proper nourishment.

How to know.—Loss of condition—the coat loses its luster somewhat, the hair becomes dry and the skin loses its mobility and mellowness. The cough may become more frequent and paroxysmal under excitement. The appetite fails somewhat and the breathing either dry or husky or moist and gurgling, with a succeeding deep inspiration with perhaps a sound distinct from the respiratory murmur which reveals the diseased state; or there is obstruction in the breathing organs or passages.

When these symptoms occur a skilled veterinarian should be called and his treatment and directions implicitly observed. Unprofessional curative treatment is not practical.

IV. Tuberculosis in Cattle.

Cow.—Tuberculosis is acute or chronic. In cattle it usually comes on very slowly and assiduously and follows the chronic course. The symptoms vary according to the organs involved. It may exist in the cow for months, even for years, without any suspicion on the part of the owner of anything amiss. There may be an occasional cough, short, weak, dry, wheezy, and aroused and repeated by opening the stable door

in cold weather—by leaving the stable suddenly for the cold outer air, by rising suddenly in the stall or by being driven in a run, or by drinking cold water or by eating dusty food. With oxen when put suddenly to draft work he blows more than the unaffected animals. The disease may exist and yet the spirits may be as good, the eye as clear and full, the coat as smooth and slick, and the skin as soft and mellow as in health. Some such animals give as much milk of as rich a quality, or when put to fatten lay on flesh as well as healthy cattle in the same herd. In the more favorable cases percussion will, however, elicit circumscribed areas of dullness or wincing, or other sign of tenderness and auscultation, or when the ear is directly applied to the part, may detect crepitation or wheezing over the same points. By covering the nose and mouth with a sack or blanket the breathing is rendered more labored and the morbid sounds become clear and more definite. A departure from the natural respiratory murmur is significant of tuberculosis. Much stands in the way of successful treatment even in this early stage. The heavy muscular and bony mass of the shoulder covers the anterior lobe and partially muffles the auscultation sound while it renders percussion useless. The thick covering of the ribs in fat animals proves a barrier to successful auscultation or percussion. In this early stage there is usually no appreciable elevation of temperature, a slight rise of one degree takes place so as to render it useless for purposes of diagnosis.

V. Tuberculosis in Advanced Stage.

When the disease is more advanced and the pulmonary lesions more extensive, the animals usually appear less thrifty on the same feed, yet fat animals are habitually killed for food that show quite extensive pulmonary tuberculosis.

With loss of condition, the coat loses its luster somewhat, the hair becomes dry and stares in patches, and the skin loses its mobility and mellowness. The cough becomes more frequent, more paroxysmal under excitement, harsher, more broken, and either dry or husky or moist and gurgling, with a succeeding deep respiration. When the skin on the last ribs is pinched up between the finger and thumb it is slower in flattening down to its normal smoothness, pinching of the spine at the shoulder or back, or it may be of the sternum, may cause wincing or even moaning, and the same may come of percussing the ribs smartly with the closed fist. As a far more decided evidence of flatness on percussion on the various affected parts and of abolition or lessening of the respiratory murmur, which is replaced by wheezing or by bronchial blowing sound, heart beats and abdominal crepitation or gurgling convey to the ear more clearly through intervening consolidated tissue. The

breathing is slightly more accelerated on exertion. The appetite fails somewhat, the secretion of milk lessens or becomes more pale and watery.

VI. Signs of Generalization of the Tubercle.

In connection with this there come on signs of generalization of the tubercle, such as irregularity of the bowels or enlargement or nodular induration of some of the superficial lymph glands. Expectoration is usually abundant. In the most advanced stages the symptoms are very characteristic. The subject becomes thin and wastes visibly from day to day. The hair is dry and erect which is most marked along the spine, the skin is scurfy, rigid, and clings firmly to the bones, the eyes are pale, deeply sunken in their sockets and bleary, the tears run over the cheeks, while a yellowish, granular, fetid, and often gritty discharge flows from the nose and dries in masses around the nostrils. The cough is weak, painful, paroxysmal and is easily aroused by pinching the back or the ribs. The breathing is liable to be hurried, even panting, and the animal may stand most of the time with nose extended to obviate the oppression that comes of recumbency. The visible mucosæ is pale and blanched and the pulse is weak and rapid. The temperature varies from 103 to 105 degrees and the milk secretion is completely arrested. In generalized tuberculosis the glands are enlarged, diarrhœa, and clouded or blood stained urine. The morbid sound in the lungs has become a complex variety in accordance with the nature of the lesion, blowing, wheezing, amphoric, friction, creaking, mucous, with all conveyances from adjacent organs. Death usually occurs in a state of complete marasmus, after months, or even years, of illness.

Tuberculosis of the abdomen affects the intestines, mesenteric glands, peritoneum, liver, spleen and pancreas. The generative organs sometimes suffer, in which case a persistent symptom is sterility.

VII. Generative Tuberculosis.

Generative tuberculosis in the bull is associated with an obvious swelling. Veterinarians classify tuberculosis of the cow into Genital Tuberculosis, Mammary Tuberculosis, Pharyngeal Tuberculosis, Cutaneous Tuberculosis, Glandular Tuberculosis, Tuberculosis of the Brain and Meninges, Tuberculosis of the Eye, Tuberculosis of the Heart, Pericardium or Pleura, and Tuberculosis of the Bones and Joints. The latter is more common in calves and growing cattle, but may be present at any age. The essential for the unprofessional stock owner is to know the causes, the prevention, the methods of amelioration, and how to know the disease when it exists as here outlined. With this knowledge he must promptly secure the services of a competent veterinary surgeon.

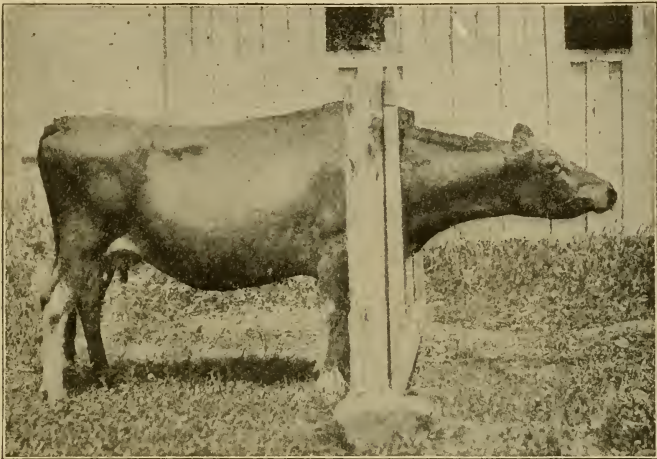
CHAPTER VI.

THE TUBERCULIN TEST OF CATTLE FOR TUBERCULOSIS.

I. THE DIAGNOSIS OF TUBERCULOSIS.—II. THE ORIGIN OF THE TUBERCULIN TEST.—III. THE NATURE AND APPLICATION OF TUBERCULIN.—IV. THE VALUE AND RELIABILITY OF THE TUBERCULIN TEST.—V. THE HARMLESSNESS OF TUBERCULIN.—VI. CONCLUSIONS REGARDING THE TUBERCULIN TEST.—VII. SUMMARY OF DIRECTIONS FOR MAKING THE TUBERCULIN TEST.

I. The Diagnosis of Tuberculosis.

The symptoms of tuberculosis in cattle are not sufficiently prominent, except in advanced stages or when superficially located, to enable one to



A COW AFFECTED WITH ADVANCED TUBERCULOSIS.

The disease is partly located in the lymph glands of the throat, as shown by the position of the head. The glands are so much enlarged that, through pressure on the larynx, they greatly narrow the orifice through which air reaches the lung; and yet the visible bodily condition of the cow has remained very good, and is better than that of most dairy cows.

diagnose this disease by the ordinary methods of physical examination. And the cattle may, without showing any clinical symptoms, be in such a stage of tuberculosis as to render them capable of spreading disease. Indeed, an animal may be fat and sleek, eat and milk well, have a bright, glossy coat, and be apparently in the pink of condition, and still be

passing tubercle bacilli through the feces or by an occasional cough, and thus endanger all the healthy cattle in the herd. Consequently such aids to diagnosis as animal inoculation, biological test, serum reaction, and the tuberculin test are made use of in arriving at a definite opinion relative to the presence or absence of this disease. The value of all but the last of these is discounted by the technique required and by their impracticability, while the tuberculin test is most satisfactory and is the best diagnostic agent known for the disease.

II. The Origin of the Tuberculin Test.

Tuberculin was invented by Koch in 1890, and was first used experimentally in treating tuberculosis in man. In these cases it was observed that its injection was followed by a rise of temperature, which led veterinarians to apply tuberculin to suspected animals to see if a similar reaction resulted. Numerous experiments showed this to be the case, and since 1891 the use of tuberculin as a diagnostic agent for tuberculosis of cattle has been almost universally adopted in all parts of the civilized world. No one thinks of accepting tuberculin as an absolutely infallible agent, but it is immeasurably more dependable than any other method that has ever been used.

III. The Nature and Application of Tuberculin.

Tuberculin is the sterilized and filtered glycerin extract of cultures of tubercle bacilli. It contains the cooked products of the growth of these bacilli, but not the bacilli themselves. Consequently, when this substance is injected under the skin of an animal it is absolutely unable to produce the disease, cause abortion, or otherwise injure the animal. In case the injected animal is normal there is no more effect upon the system than would be expected from the injection of sterile water. However, if the animal is tuberculous, a decided rise of temperature will follow the use of tuberculin.

In practice the tuberculin test is applied by first taking a sufficient number of temperatures, usually three, at intervals of two hours to ascertain the normal variation of temperature of the animal to be tested. The dose of tuberculin (which should always be specified on the label) is then injected hypodermically between 8 and 10 p. m. on the day of taking the preliminary temperatures. On the following day "after" temperatures are recorded every two hours, beginning at 6 a. m. and continuing until twenty hours following the injection.

IV. The Value and Reliability of the Tuberculin Test.

As a result of this method an accurate diagnosis may be established in over 97 per cent of the cases tested. The relatively few failures in

diagnosis are included among two classes of cattle. The first class contains those that are tuberculous, but which do not react either because of the slight effect of an ordinary-sized dose of tuberculin on an advanced case of the disease with so much natural tuberculin already in the system, or on account of a previous test with tuberculin which produces a tolerance to this material lasting for about six weeks. The second class includes those that are not tuberculous, but which show an elevation of temperature as a result of (a) advanced pregnancy; (b) the excitement of oestrus; (c) concurrent diseases, as inflammation of the lungs, intestines, uterus, udder, or other parts, abortion, retention of afterbirth, indigestion, etc.; (d) inclosure in a hot, stuffy stable, especially in summer, or exposure to cold drafts or rains; or (e) any change in the method of feeding, watering, or stabling of the animal during the test.

Notwithstanding all these possibilities of error, the results of thousands of tests show that in less than 3 per cent of the cases tested do these failures actually occur. In the first class the chances of error are decidedly reduced by the skilled veterinarian by making careful physical examination and diagnosing these advanced cases, and by the injection of double or triple doses into all recently tested cattle, with the taking of the after temperatures beginning two hours following the injection and continuing hourly for twenty hours. In the second class errors are avoided by eliminating those cases from the test that are nearing parturition or are in heat, or show evidence of the previously mentioned diseases, or exhibit temperatures sufficiently high to make them unreliable for use as normal. Then, in reading after temperatures it is advisable not to recognize as a reaction an elevation of temperature less than 2° F., or one which at the same time does not go above 103.8° F., and the temperature reaction must likewise have the characteristic rainbow curve. (Those cases which approximate but do not reach this standard should be considered as suspicious and held for a retest six weeks later.) In addition, a satisfactory tuberculin must be used, also an accurate thermometer and a reliable syringe in order that a sufficient dose of tuberculin may be given. Finally, the number of apparent errors of the tuberculin test will be greatly diminished if a careful post-mortem examination is made, giving special attention to the lymph glands.

This low percentage of failures being the case, cattle owners should welcome the tuberculin test not only for their own interest, but for the welfare of the public as well. Where this method of diagnosing the disease has been adopted tuberculosis is gradually being eradicated, while it is spreading rapidly and becoming widely disseminated in those districts where the tuberculin test has not been employed. Without its use the disease can not be controlled, and the cattle owner is confronted with serious and continuous losses; with its use the disease can be erad-

icated from the herd, a clean herd established, and the danger of its spread to man removed. Tuberculin may, therefore, be considered a most beneficial discovery for the stock raiser. Strange to say, many of these men have been incredulous, antagonistic, or prejudiced against the tuberculin test by misinterpreting published statements, by incorrect, unsubstantiated, or exaggerated reports, and by alleged injurious effects to healthy cattle.

Law has clearly stated the question when he says:

Many stock owners still entertain an ignorant and unwarranted dread of the tuberculin test. It is true that when recklessly used by ignorant and careless people it may be made a root of evil, yet as employed by the intelligent and careful expert it is not only perfectly safe, but it is the only known means of ascertaining approximately the actual number affected in a given herd. In most infected herds, living under what are in other respects good hygienic conditions, two-thirds or three-fourths are not to be detected without its aid, so that in clearing a herd from tuberculosis, and placing both herd and products above suspicion, the test becomes essential.

* * * * * * * *

In skilled hands the tuberculin test will show at least nine-tenths of all cases of tuberculosis when other methods of diagnosis will not detect one-tenth.

It is perfectly natural that there should be objection to its use among those who are not acquainted with its method of preparation or its properties; but it is difficult to explain the antagonism of farmers who are familiar with the facts connected with the manufacture and use of tuberculin. Probably the most popular objection to tuberculin is that it is too searching, since it discovers cases in which the lesions are small and obscure. While this fact is admitted, it should also be borne in mind that such a small lesion to-day may break down and become widely disseminated in a relatively short period. Therefore any cow affected with tuberculosis, even to a slight degree, must be considered as probably dangerous not only to the other animals in the herd, but also to the consumer of her products.

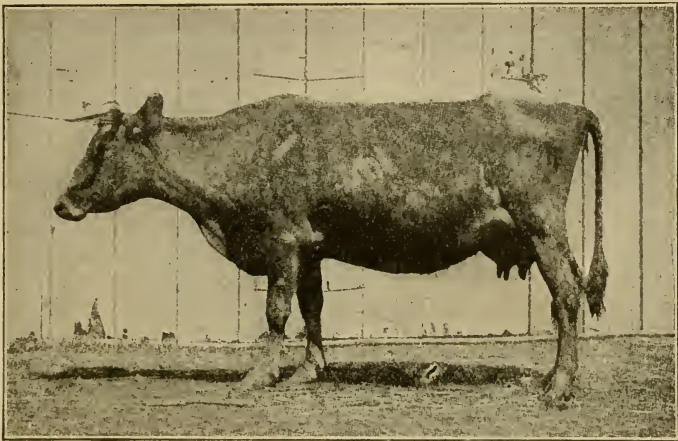
V. The Harmlessness of Tuberculin.

Furthermore, tuberculin must be considered as harmless for healthy animals in view of the results revealed by numerous tests covering vast numbers of animals. And it has also been clearly demonstrated that tuberculin interferes in no way with the milking function in healthy cattle; neither in the quantity of milk nor in butterfat value has any variation been detected.

Nocard and Leclainche state:

Direct experiments and observations collected by thousands show that the tuberculin injections have no unfavorable effect. With healthy animals the system is indifferent to the inoculation; with tuberculous animals it causes only slight changes, which are not at all serious.

Most of the objections to tuberculin would probably be removed if some method of compensation for the reacting animals could be devised. Thus, in Pennsylvania, where tuberculosis is being eradicated with more success than in any other State, and where there are usually three times as many voluntary requests on file for the application of the test as can be made, all reacting animals are paid for by the State. As the suppression of tuberculosis is a public health measure, it would appear perfectly



A VISIBLY TUBERCULOUS DAIRY COW.

Such cattle expel tubercle bacilli almost without exception with their feces and with a material that is drolled, slobbered and sprayed from their mouths.

logical for the State governments to reimburse cattle owners appropriately for the animals condemned and slaughtered. Provision could be made to pay 70 per cent of the appraised value of the condemned animals, not to exceed \$30 a head for common stock or \$60 for registered stock. Such legislation should also include a requirement for the testing of all dairy and breeding cattle coming into the State.

VI. Conclusions Regarding the Tuberculin Test.

As a result of the careful study of the tuberculin test, Salmon draws the following conclusions:

1. That the tuberculin test is a wonderfully accurate method of determining whether an animal is affected with tuberculosis.
2. That by the use of tuberculin the animals diseased with tuberculosis may be detected and removed from the herd, thereby eradicating the disease.
3. That tuberculin has no injurious effect upon healthy cattle.
4. That the comparatively small number of cattle which have aborted, suffered in health, or fallen off in condition after the tuberculin test were either diseased before the test was made or were affected by some cause other than the tuberculin.

VII. Summary of Directions for Making the Tuberculin Test.

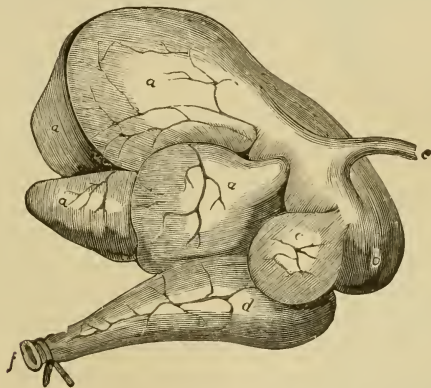
1. Stable cattle under usual conditions and among usual surroundings, feeding and watering in the customary manner.
2. Make a physical examination of each animal, and give to each one some designation by which the animal will be known throughout the test.
3. Take each animal's temperature at least three times at two or three hour intervals on the day of injection; for instance, at 2, 5, and 8 p. m.
4. At 8 or 10 p. m. inject a dose of tuberculin under the skin in the region of the shoulder, using a sterile hypodermic syringe after disinfecting the skin at the seat of injection with a 5 per cent solution of carbolic acid or a similar antiseptic solution.
5. Tuberculin is not always concentrated to the same degree, and therefore the dose, which should always appear on the label, varies considerably. The dose of imported tuberculin is 0.25 c. c. for an adult cow, and before injection is diluted with sterile water to 2 c. c. The tuberculin made by the Bureau of Animal Industry is prepared so that it will not be necessary to dilute it, and the dose is 2 c. c. for an adult animal. Yearlings and 2-year-olds, according to size, should receive from 1 to 1½ c. c., while bulls and very large animals may receive 3 c. c.
6. At 6 a. m. on the day following the injection of tuberculin commence taking temperatures, and continue every two or three hours until the twentieth hour after injection, at which time if there is no tendency for the temperature to rise the test may cease.
7. A rise of 2° F. or more above the maximum temperature observed on the previous day, providing the temperature after injection exceeds 103.8° F., should be regarded as an indication of tuberculosis. Those cases which approximate but do not reach this standard should be considered as suspicious and held for a retest six weeks later, giving double the original dose.

CHAPTER VII.

DISEASES OF THE DIGESTIVE ORGANS.

- I. GLOSSITIS, OR INFLAMMATION OF THE TONGUE; AND PARALYSIS OF THE TONGUE.
—II. HOVEN, OR TYMPANITIS.—III. IMPACTION OF THE RUMEN, OR MAW-
BOUND.—IV. IMPACTION OF THE OMASUM, OR FARDLE-BOUND.—V. DYSPEP-
SIA.—VI. CONSTIPATION.—VII. DIARRHŒA, OR SCOURS.—VIII. DYSEN-
TERY.—IX. ENTERITIS.—X. PERITONITIS.—XI. HERNIA.—XII. STRAN-
GULATION, OR GUT-TIE.

It will be readily seen by the annexed cut, that the stomachs of ruminants are very complicated, and hence when out of order, serious results often follow. By noticing the relative positions of the compartments,



COMPARTMENTS OF THE STOMACH OF RUMINANTS.

- | | |
|---------------------------------|--|
| a. Rumen, or first compartment. | d. Abomasum, or fourth compartment. |
| b. Reticulum, or second do. | e. Esophagus, or gullet. |
| c. Omasum, or third do. | f. Entrance to the intestines, or pylorus. |

the following pages will be more readily understood. The four compartments (or, as they are often termed, the four stomachs) all float loosely in the cavity of the trunk, excepting the paunch (rumen), which grows to the side in the left flank.

I. Glossitis, or Inflammation of the Tongue; and Paralysis of the Tongue.

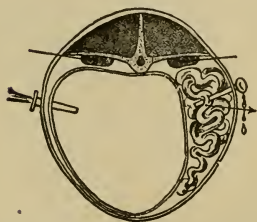
The mouth and tongue are frequently wounded from drenching in a careless manner, or by foreign bodies in the fodder, thorns, etc. The



TROCHAR AND CANNULA.

swelling is sometimes very great, especially if it is the tongue that is injured. Temporary paralysis of that organ occasionally ensues, in which case it hangs from the mouth, like some lifeless appendage.

What to do.—Examine the mouth carefully, and remove all offending substances. If the tongue hangs pendulous, foment it with hot water; if very bad, a few scarifications, to make it bleed a little, will do it good. Apply the following lotion three or four times a day, with a swab:

POSITION OF THE INTESTINES
OF THE COW.

Left spot where the Trokar must be pierced. By piercing on the right side, the intestines would be injured.

No. 25.

1 Ounce vinegar,
2 Ounces honey,
 $\frac{1}{2}$ Pint water,
Mix.

II. Hoven, or Tympanitis.

This is distension of the rumen or paunch with gas, the product of fermentation accompanying acute indigestion. It commonly follows a hearty feed on clover or other succulent diet, or is one of the *sequelæ* in a case of choking.

How to know it.—The paunch is terribly distended with gas, so much so that the space between the last ribs and the points of the hips is

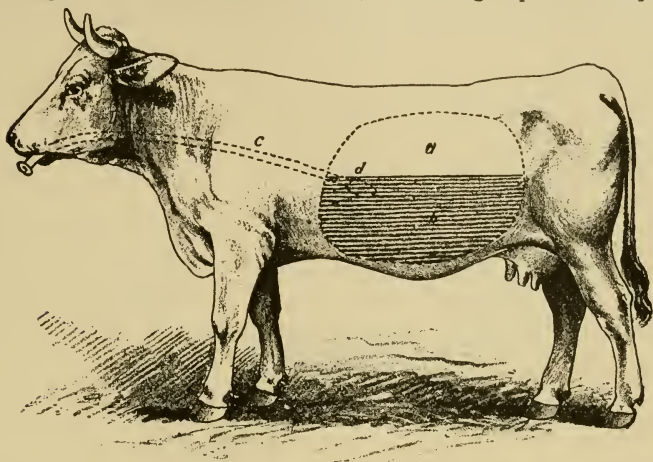


OX SUFFERING FROM HOVEN,

puffed up above the surface, and when tapped, is elastic and resonant, like a drum, especially on the left side. The breathing is difficult and painful, becoming more so as the gas increases; the nostrils are dilated, the eyes look wild, and gas and food are belched up from the stomach, and dribble from the mouth. The animal moves slowly and uneasily about,

moaning with each expired breath. If not relieved, death follows from suffocation, rupture of the stomach, or blood poisoning by the gases.

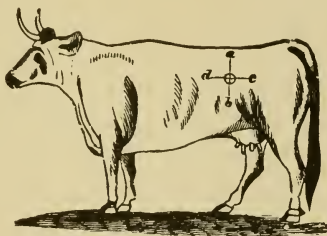
What to do.—If it is a very urgent case, plunge the trochar and canula into the region of greatest distension on the left side, at a point midway between the spines of the loins, last rib and point of the hip, pointing the trochar in and downward, and letting it pass in obliquely



WRONG POSITION OF THE ANIMAL FOR USING THROAT TUBE TO RELIEVE IT OF GAS.

The throat tube (c) comes with its end piece (d) in the food gruel (b) and clogs the tube. (a) Gas over stomach contents. (b) Contents of stomach. (c) throat tube. (d) Button dipping into the contents of the stomach.

to avoid the kidney. When food gets over the end of the tube (canula), pass in a piece of whalebone and push it off. If the measures above directed are not practicable, and a probang is handy, insert the gag or the balling iron in the mouth, and with one man to steady the head, pass in the probang, which will evacuate the gas from the stomach. After the acute symptoms are over, give a brisk purgative. No. 8 will be found effectual. Feed light for several days.



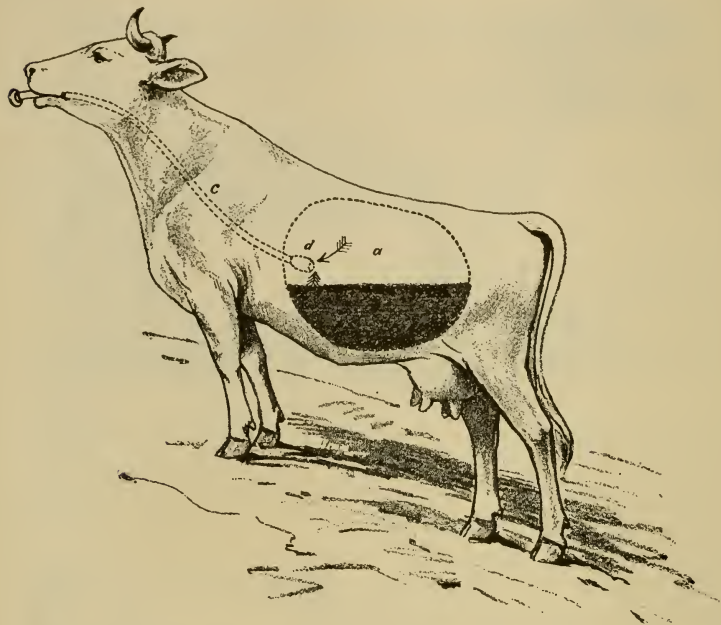
DIAGRAM, SHOWING WHERE TO TAP THE RUMEN FOR HOVEN.

Insert trochar at point where the lines cross.

III. Impaction of the Rumen, or Maw-Bound.

After an unusually full meal, the grain often becomes impacted in the animal's stomach, causing its temporary paralysis, the whole mass lying there like so much soggy stuff in a leather bag. Great distress necessarily follows, which is aggravated when fermentation sets in, death often resulting from suffocation, or in a more protracted case from nervous prostration and blood poisoning.

How to know it.—It will have the same outward appearance of tremendous distension as tympanitis, but when the bloated section is touched it is found to be soft and pitty, so that when dented the dent remains or rises slowly.



CORRECT POSITION OF THE ANIMAL FOR USING THROAT TUBE TO RELIEVE GAS IN THE STOMACH.

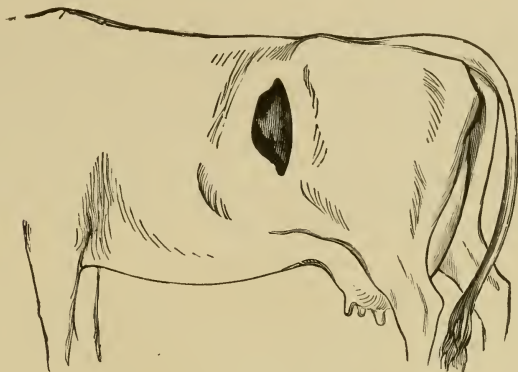
Throat tube (c) comes with its end piece (d) not in the food gruel (b) but in the gas area (a).

What to do.—When paralysis of the stomach has actually taken place from engorgement, there is nothing of any avail but to empty the umen with the hand. This operation, which is termed rumenotomy, will be found described in the chapter on operations. When the stomach is emptied, and before sewing up the wound, pour in carefully the purgative No. 8, with half a pint of ale added as a stimulant. Restrict the diet for a few days, giving only easily digested food—grass, sloppy mash, etc.

IV. Impaction of the Omasum, Fardle-bound, Dry Bible, or Dry Murrain.

The omasum, or third stomach, is a sack of a great many leaves, arranged so as to rub constantly on one another, keeping up a grinding action

on the food. This stomach is apt to suffer from want of moisture, whereupon the food becomes impacted between the leaves, leading to inflammation. This condition is variously known as fardle-bound, bake of the many-plies, bake of the manifolds, etc.



RUMEN EXPOSED FOR MECHANICAL REMOVAL OF ITS CONTENTS.

How to know it.—It comes on gradually as an ordinary case of constipation, with abdominal pain, a looking around to the right side, and disinclination to move; fever sets in, and slowly increases as the disease makes progress; there is great tenderness in the right side just below the ribs, at which point a hard round substance can be felt; the colic pains and fever grow more intense; the animal makes constant attempts to pass fæces; delirium and vertigo set in, and death soon follows.

What to do.—The treatment must be prompt and persistent. Give a full cathartic as follows:

- | | |
|---------|------------------------|
| No. 26. | 1½ Pounds epsom salts, |
| | 2 Ounces ginger. |
| | 2 Ounces gentian, |
| | 2 Drachms calomel, |
| | 20 Drops croton oil, |
| | 1 Pint syrup, |
| | 2 Quarts warm water, |
| | Mix. |

Give as one dose, and encourage the drinking of as much water afterwards, from time to time, as possible. Give injections of warm water and soap every half hour. If it is cold weather, blanket the patient

warmly. To insure the action of the purgative, give every two hours a stimulating dose composed as follows :

No. 27.	1 Ounce liquor ammonia,
	1 Quart warm ale,
	$\frac{1}{2}$ Ounce essence of ginger,
	Mix.

It is not safe to repeat the cathartic, nor would it be of any use ; for if it remains inoperative, in spite of the stimulants, double the dose would not be more likely to effect a passage, but in the persistence to accomplish this end a quart of melted lard may be given night and morning, oftentimes with satisfactory results. During convalescence give recipe No. 7 or No. 20.

When a passage is despaired of, and as a last resort, tepid water may be injected into the jugular vein, or galvanism applied to the region of the stomach ; but the case is well-nigh hopeless.

V. Dyspepsia.

The lower animals are not supposed by the great majority of people ever to be troubled with dyspepsia, but they are, nevertheless. All the domestic animals are liable to suffer from chronic indigestion from irregular or improper feeding, especially if to this is added exposure to the cold storms and winds of the straw yard, without housing, etc.

How to know it.—A capricious appetite is noticed. Dainty at first, the animal may shortly be seen licking walls, dirt, or lime, and chewing sticks, etc. ; he is inclined to eat the bedding, or take up coal, stones, etc., to chew, showing a depraved appetite for something he has not got. After a while, there will be a staring coat, eruptions, belchings from the stomach, and emission of gas from the rectum ; the manure is small in quantity, dry and glazed ; the flanks drop in, except when distended with gas ; the skin and hair feel dry and coarse ; and there is a rapid loss of flesh. It is not often a very serious condition in itself, but it weakens the animal and lowers the tone of the vital functions, so that he is unable to resist other diseases ; and it especially predisposes to attacks of tympanitis, constipation or diarrhœa, tuberculosis, cancerous ulcers, and purpura hæmorrhagica.

What to do.—Give phosphate of lime in the form of ground bones, and a little lime water—about half a teacupful—morning and night in a bran mash, or the following recipe :

No. 28.	3 Drachms bi-carbonate of soda,
	2 Drachms gentian,
	2 Drachms ginger,
	Mix.

Give as one dose, repeating it morning and night. Give a complete change of food, including some green grass, roots, etc.

VI. Constipation.

This is the condition which exists when there is not sufficient moisture in the stomach and bowels, and the fæces are passed tardily and in hard, dry lumps. It is always aggravated, and often caused, by too dry food, insufficient or impure water and too little exercise. It is often symptomatic of other diseases, especially of liver complaints.

How to know it.—It is recognized by the hard, dry manure, which is also sometimes glazed. It is apt to run into inflammation of the bowels, colic, etc., and when existing as a symptom of other diseases, nearly always indicates serious derangement of the system.

What to do.—If it is in the winter or late in the fall, give from one to two quarts of melted lard; if in the spring or summer, give recipe No. 8. Give laxative food with more bulk, and plenty of good, pure water to drink. Salt the cattle at least twice a week in winter, and three times in summer. If a mild case, it is quite possible that laxative food, with a handful of salt and plenty of water, will be all that is needed. Injections of warm water and soap are valuable adjuncts to either laxatives or purgatives.

VII. Diarrhœa, or Scours.

This is caused by improper and inferior food, irregularity in feeding, etc., and like its opposite, constipation, often accompanies other diseases, particularly indigestion and dyspepsia, especially if dependent upon an acid condition of the system.

How to know it.—The manure is passed much too often, and in a thin, watery condition, at times with considerable straining. If it runs on long, there is a feverish condition of the stomach and bowels, with great thirst, but little or no appetite; rumination is suspended; the milk dries up; the belly is tucked up and the back arched; the coat stares; in some cases there is considerable flatulence. The further progress of the disease is marked by rapid loss of flesh and animal heat, the temperature falling more and more below the normal; the pulse rises as the weakness increases, and at length becomes imperceptible; and death follows, as a result of the cessation of the digestive functions, and consequent lack of nutrition. It is further hastened by the weakening effects of the excessive discharges. It is particularly fatal to young calves, among whom it is quite common.

What to do.—Usually, the best plan is to give alkalines along with astringents, with anodyne enemata.

It is often the case, however, that laxatives, or even purgatives, are



CHRONIC DYSENTERY.

needed, to restore a healthy condition to the stomach and bowels. For young calves that are fed on milk,—with whom an acid condition of the stomach is common,—give one or two tablespoonfuls of limewater, in the milk, night and morning; and a teacupful of gentian infusion, with a quart of starch gruel, may be added to the milk and limewater. Any of the following mixtures may be given:

- No. 29. 1 Ounce prepared chalk,
 ½ Ounce powdered catechu,
 2 Drachms powdered ginger,
 ½ Drachm powdered opium,
 ½ Pint peppermint water,
 Mix.

Give, morning and night, from two to four tablespoonfuls, according to the size of the calf.

- No. 30. 2 Ounces tincture of catechu,
 2 Ounces tincture of cardamoms,
 2 Drachms carbonate of soda,
 Mix.

Divide into two to four doses, according to age of calf, and give one of them morning and night.

- No. 31. ½ Drachm powdered opium,
 1 Ounce tincture of cardamoms,
 3 Drachms sulphuric ether,
 1 Pint linseed tea, (or starch gruel),
 Mix.

Divide into six doses, and give one of them night and morning. If astringent mixtures and the limewater do no good, give from two to four tablespoonfuls of castor oil, or, instead, the following mixture:

- No. 32. 4 Ounces tincture of rhubarb,
 2 Drachms powdered ginger,
 4 Ounces warm gruel,
 Mix.

Give as one dose, and follow it with some doses of No. 30 or 31. The four recipes above given, it must be remembered, are all for calves.

For full grown cattle, give some of the following mixtures:

- No. 33. 1½ Ounces prepared chalk,
 2 Drachms powdered catechu,
 ½ Drachm powdered opium,
 2 Drachms powdered gentian,
 1 Pint starch gruel,
 Mix.

Give as one dose, and repeat in twenty-four hours if necessary.

- No. 34. 2 Drachms powdered opium,
 4 Ounces powdered starch,
 1 Ounce sulphuric ether,
 1 Pint cold ale,
 Mix.

Give as one dose. By substituting tepid water for the ale, this recipe may also be used with advantage as an injection.

- No. 35. ½ Drachm tannic acid,
 1 Drachm powdered opium,
 1 Ounce powdered gentian,
 1 Pint warm ale,
 Mix.

Give as one dose.

If laxatives are required, give half a pint of melted lard, or, instead, the following mixture :

- No. 36. 1 Drachm calomel,
 2 Drachms powdered opium,
 1 Quart gruel,
 Mix.

Give as one dose.

In all cases, restrict the quantity of drinking water, allowing it often but only a little at a time, and dissolving an ounce of chlorate of potash in each pailful of water. Feed on light, easily digested food, and keep the animal perfectly quiet for a few days.

VIII. Dysentery.

How to know it.—The inflammation of the mucous lining of the stomach and bowels which characterizes this disease, causes severe straining, and watery, offensive, bloody discharges, and high fever, with excessive thirst ; there is loss of appetite ; the secretion of milk ceases, as does rumination also ; emaciation begins early and rapidly increases ; discharges from the eyes are seen ; colicky pains occur frequently, the back being arched, and tail elevated ; the general prostration is very great, and often proves fatal. If too much water is drank, tympanitis is liable to ensue and cause death suddenly from suffocation.

Causes.—Dysentery may follow the ingestion of acid, poisonous plants, or it may come on as the sequel of neglected diarrhœa, or of almost any other debilitating disease.

What to do.—Give a laxative as follows :

- No. 37. 7 Ounces epsom salts,
 2 Drachms powdered opium,
 2 Drachms powdered gentian,
 1 Pint gruel,
 Mix.

Give as one dose. Or, instead, No. 36 may be given. Dissolve chlorate of potash in the drinking water, as prescribed for diarrhœa. Give frequent injections of starch gruel, with an ounce of tincture of opium in each one. If the fœces are very offensive, give the following, half of it by the mouth, and the rest as an injection :

No. 38.	$\frac{1}{2}$ Ounce chloride of lime,
	$\frac{1}{2}$ Ounce tincture arnica,
	1 Ounce sulphuric ether,
	2 Quarts starch gruel,
	Mix.

Any of the astringent recipes given for diarrhœa are applicable, following the administration of laxatives. Feed lightly, and nurse carefully.

IX. Enteritis.

This is inflammation of the digestive apparatus, and especially (as its name implies) of the intestines, but is quite different from the inflammatory state of dysentery.

Causes.—It may come from eating various poisonous substances, either vegetable or mineral ; or it may follow the too sudden checking of diarrhœa. Injuries to the abdomen sometimes cause it.

How to know it.—There is constipation, such fœces as are passed being hard, dry, and coated with mucus, and sometimes offensive and bloody ; high fever and quick, hard pulse ; dry mouth, with an offensive fur over the tongue and cheeks ; the thirst is insatiable ; the appetite fails, and so does the milk ; rumination is suspended ; colicky pains may occur, though the pain is more likely to be constant ; breathing becomes labored, and more or less tympanitis may be noticed ; the urine is scanty and high colored ; the back is arched ; the animal moans, grinds his teeth, and refuses to move ; the pulse gradually becomes imperceptible, and the extremities cold ; and death soon follows, after an illness lasting from one to two weeks.

Post mortem appearances are usually as follows : The first and third stomachs are filled with food, dry and impacted—almost baked, and when this is taken out, the epithelium of the stomachs comes off with it ; the fourth stomach and bowels are inflamed ; and more or less lymph, in shreds, is found, as also some ulcers, in the large intestines. The liver is generally softened, and all other internal parts very much bleached, indicating great wasting.

What to do.—Give a purgative as promptly as possible. No. 26, omitting the croton oil, will be the thing. Encourage the animal to drink large quantities of water and other fluids, and supplement the purgative with the following injection :

No. 39.	1 Pint linseed oil, 4 Ounces oil turpentine, 30 Drops croton oil, 1 Quart warm water, 1 Ounce soft soap, Mix.	No. 40.	4 Grains strychnine, 1 Ounce spirits of wine, 6 Drops sulphuric acid, Mix.
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Repeat No. 39 three times a day till a full purgative action is secured. If the constipation does not yield, give hypodermic injections of No. 40.

When dissolved, inject from ten to twenty drops under the skin with a syringe suitable for the purpose. Ten drops of this solution contain one-twelfth of a grain of strychnine. If prostration follows, give the following:

No. 41.	2 Drachms camphor, $\frac{1}{2}$ Ounce sulphuric ether, 4 Ounces acetate of ammonia (as directed below), Mix.
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The camphor is to be dissolved in the sulphuric ether, and the other ingredient added afterwards. Give as one dose in ale or gruel.

If violent purgation takes place, it can be controlled with flour and water,—a double handful of flour to four or five quarts of water; or linseed tea may be given to drink. The prescriptions for diarrhoea will be found convenient in cases of superpurgation.

X. Peritonitis.

This is inflammation of the peritoneum, a serous membrane lining the cavity of the belly, and covering the bowels and other abdominal viscera.

Cause.—It is always the result of injury, or of secondary inflammation following the operation of rumenotomy.

How to know it.—The animal stands dejectedly, and has fits of shivering, which are especially noticeable around the flanks and hind parts; all the symptoms of fever are present, the pulse, urine, temperature, rumination, etc., all being affected; the breathing is labored and done mostly with the chest, the ribs being fixed; the sufferer looks around to her flanks, and paws or crouches with pain; all the symptoms become aggravated, and the temperature suddenly falls below the normal; the belly fills with water, and death speedily follows.

If a post mortem is had, large quantities of reddish water will flow from the belly, as soon as the membranes are cut, and unmistakable signs of inflammation will be seen around the injury; and sometimes there are adhesions between the intestines.

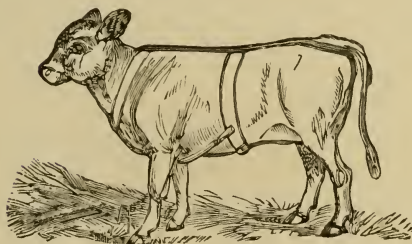
What to do.—Give recipe No. 8, following it six or eight hours after with No. 36; also, frequent injections of soap and water. No. 18 may also be given with advantage. If prostration follows the action of the purgative, give No. 41. During convalescence, give No. 21.

XI. Rupture or Hernia.

This is familiarly known as rupture. The investing membrane of the abdomen is torn, as a result of external injury or of severe strain, thus letting out the intestines into the adjacent spaces. The swelling or enlargement of the hernia is sometimes seen as large as a half bushel. It is soft, and is easily pushed back if not very large. Sometimes, when a great quantity of the intestines is protruded, what is called strangulated hernia results, which is always dangerous, and unless reduced, causes death from inflammation and mortification. Umbilical hernia (at the navel) is sometimes seen at birth in calves.

What to do.—For calves, a compress or truss is put on, as shown in the annexed cut, adjusting it so as to make considerable pressure. If this fails, wooden clamps, applied so as to include the skin over the rupture, and just tight enough to set up a certain amount of adhesive inflammation, will be effectual, the compress being applied over the clamps.

In ventral (belly) hernia, little can be done, unless the rupture



TRUSS FOR UMBILICAL HERNIA.

is small, in which case the same appliances may be used. In a case of strangulated hernia, when the gut cannot be pushed back, the skin may be opened and the parts put back and the wound sewed up again,—first that in the abdominal wall, and then the skin,—and a compress applied.

Scrotal hernia is very difficult to reduce. The

animal must be castrated by what is called the covered operation, for which a qualified veterinary surgeon will be required.

XII. Strangulation, or Gut-tie.

This is a passage of the intestines into the abdominal ring. It is only seen in steers and oxen. The contraction of the spermatic cord following castration leaves the abdominal rings open, and during severe exertion, as in hard work, the intestines are forced through.

How to know it.—All the symptoms of abdominal difficulty are seen, together with pain and soreness in the flank affected.

What to do.—The ox must be cast, an opening made in the flank, the gut replaced, and the opening sewed up again, and a compress applied, most of which are difficult and delicate operations, that require the services of a qualified veterinary surgeon.

CHAPTER VIII.

DISEASES OF THE URINARY ORGANS.

I. NEPHRITIS, OR INFLAMMATION OF THE KIDNEYS.—II. RETENTION OF THE URINE, OR DYSURIA.—III. INCONTINENCE OF URINE, OR ENURESIS.—IV. ALBUMINURIA, OR ALBUMINOUS URINE.—V. HÆMATURIA, OR BLOODY URINE.—VI. CYSTITIS, OR INFLAMMATION OF THE BLADDER.—VII. LITHIASIS, OR GRAVEL.—VIII. CALCULI.

I. Nephritis, or Inflammation of the Kidneys.

Causes.—External violence, wounds, strains, etc.; eating acrid, diuretic plants; and too free use of diuretic medicines

How to know it.—It is rather rare in cattle. When it occurs, there



OX SUFFERING FROM INFLAMMATION OF THE KIDNEYS.

are colicky pains, with great uneasiness; the urine is thick and dark colored, and voided often, in small quantities and with much straining and pain; there is tenderness over the loins, especially at the sides, immediately below the transverse spines of the lumbar vertebræ; the gait is straddling, and lameness is noticeable,—sometimes in one leg, sometimes in both; the appetite is poor; fever runs high; rumination ceases; sometimes blood, and in the later stages pus, is

evacuated with the urine; the nose becomes hot and dry, the horns and extremities cold, and the breathing labored. Diarrhœa often sets in, and sometimes dysentery; and this state is usually followed by constipation. There is profuse sweating, great pain, and arching of the back; the pulse becomes small and weak; and stupor and death soon follow.

Post mortem shows the affected kidney or kidneys enlarged and congested—usually, with an abscess also.

What to do.—Avoid purgatives, especially salines, but give the following recipe in preference:

No. 42.	3 Ounces Mindererus' spirit,
	20 Drops tincture aconite root,
	1 Pint linseed tea,
	Mix.

Give as one dose Repeat it every two hours till better, then drop off in frequency as the case will admit. Give large quantities of linseed tea or slippery elm water to drink, with warm water injections. Apply

hot water rugs to the loins. Feed on sloppy food, and keep the patient perfectly quiet.

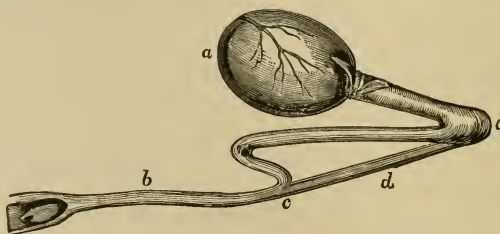
If the animal recovers, he had better be fed for the butcher, for the trouble is liable to recur, and unremitting care would be required to guard against the effect of storms, extremes of temperature, etc.

II. Retention of the Urine, or Dysuria.

Cause.—It may be brought on by eating acrid herbs, causing inflammation of the urinary organs, irritability and spasms of the neck of the bladder. Most commonly, however, it is a symptom of some other disease, the pressure upon the neck of the bladder resulting from inversion of the rectum, calculi, or other visceral trouble.

How to know it.—Frequent but ineffectual attempts to pass the urine, straining, and colicky pains; the hind legs are raised and moved about restlessly, and the animal looks around towards the flank.

What to do.—Give hot water injections by the rectum, (and in the female by the vagina also); add to the injection one ounce of opium, or three drachms of fluid extract of belladonna. Repeat these in fifteen minutes. If there is still no relief, the urine must be drawn off with a catheter. With the female this is very easily done, the catheter being inserted through the opening to the bladder, which will be found on the floor of the vagina, and about three inches from the external orifice. With the male it is a far more serious operation, and, unfortunately, retention of the urine is far more common in the male than in the female, owing to the peculiar formation of the urethra, a slight pressure on one



URETHRAL CANAL, ETC., OF THE OX.

- a. The bladder.
- b. The urethral canal.
- c. Curves of the urethral canal.
- d. The retractor muscle of the penis.

of the curves being sufficient to cause the difficulty. The operation necessary to draw off the urine from the ox will be found described in the chapter on operations. After using the catheter, give the injections prescribed above, with a light diet and some linseed tea, for a few days.

III. Incontinence of Urine, or Enuresis.

This difficulty may be considered the opposite of that just considered; the urine dribbles away involuntarily.

Cause.—Paralysis of the muscular coat of the bladder and sphincter vesicæ; calculi; or pervious urachus after birth.

What to do.—Give purgative No. 8, and follow it with one and a half drachm doses of *nux vomica*, morning and night, in soft feed. If there are calculi, remove them. If the case is a bad one, inject cold water into the rectum, and give ten grains of powdered cantharides in soft food, morning and night.

IV. Albuminuria, or Albuminous Urine.

This is the same as Bright's disease in the human subject, and, in strictness, is probably a blood disease.

Cause.—The blood is impoverished, to a certain extent, by too much and too long continued sameness of diet, in consequence of which there is a deficiency of blood forming constituents, with a low, unassimilable quality of albumen, which is excreted by the kidneys. This leads in time to a degeneration of those important organs in two different forms,—the large, white kidney, and the small, red kidney. The former secretes very little urine, the latter great quantities of it.

Albuminuria is most common in sections where turnips are the almost exclusive diet. They cannot, alone, support the system in a healthy condition, and the impairment of the vital functions thus resulting, seems to affect the kidneys more than other organs, and in this peculiar way. It is generally regarded as the effect of bad management and injudicious feeding.

How to know it.—In those rare cases where the trouble arises from an injury, the back will be arched and the feet drawn together, indicating injury to the loins; but in ordinary cases, the most common and characteristic symptom is the stretching at full length, getting the hind and fore feet as far apart as possible. Generally, there is constipation, a straddling gait, stiffness, and disinclination to move. The urine, which is thick, mucilaginous and dark colored, often fails to produce albumen on the application of heat (a common test), but with tincture of galls, solution of bi-chloride of mercury and alcohol, will always separate some. Death often results from paralysis of the hind parts, blood poisoning and coma.

What to do.—Examine the bladder; if full, evacuate it as described for retention. Give recipe No. 8, and injections, to overcome the constipation, and afford a complete change of diet, cutting short on green food, except grass, which should be from uplands, but allowing more

grain. Also, give milk, eggs, etc. If it still continues, give the following recipe :

No. 43.	2 Drachms sulphuric acid,
	1 Ounce tincture of cardamoms,
	1 Pint water,
	Mix.

Give as one dose.

V. Hæmaturia, or Bloody Urine.

Of this there are two kinds. *Traumatic hæmaturia* is the effect of external violence, by which the loins and kidneys are injured, and may be recognized without difficulty, by the blood passing in clots distinct from the urine which contains them.

Idiopathic hæmaturia follows active congestion of the kidneys from calculi, eating acrid herbage, excessive use of diuretics, and the like causes. It may be distinguished by the red appearance of the urine. There are also signs of fever, and, upon suitable tests, the urine will be found to contain albumen. Inflammation of the kidneys (nephritis) is apt to follow.

What to do.—The traumatic form is best treated by injections of cold water into the rectum, and by cold cloths laid over the loins. The idiopathic kind treat the same as albuminuria, (see preceding section), and rub mustard paste well into the loins.

VI. Cystitis, or Inflammation of the Bladder.

This is inflammation of the mucous membrane lining the bladder.

Causes.—Any derangement of the digestive organs is apt to change the character of the urine, making it acid and irritating, instead of alkaline, as it is in health. In other instances, cystitis is caused by eating poisonous plants, by calculi, and incautious use of diuretic medicines. Cantharides is peculiarly apt to cause it, either by being absorbed when spread over too large a surface of the skin, or by being given internally in too large doses.

How to know it.—By colicky pains, nose turned towards the flank, efforts to vomit, and, if a male, by the testicles being drawn up towards the body; the urine is passed with pain, and is albuminous; its flow may be either retarded or accelerated; there is evident constitutional disturbance and prostration; the fæces are often covered with blood; there is profuse perspiration; gastro-enteritis or nephritis may ensue; and death results from either rupture of the bladder or prostration.

The main feature on post mortem examination, is the inflammation of the lining of the bladder. There are signs of blood poisoning also.

usually in the purple spots, and the odor of urine is present throughout the entire body.

What to do.—Avoid oleaginous purgatives, resorting, in preference, to large quantities of linseed tea, or gum arabic water. Give recipe No. 8, and soothing injections. In short, adopt the same treatment as for nephritis. (See Section I.)

VII. Lithiasis, or Gravel.

Abnormal conditions of the urine, in which either an acid or alkaline condition exists to an excessive degree, predispose to the formation of sand-like deposits in the bladder, from the union of the acids or alkalies with the urea in a changed condition. The presence of these deposits excites the bladder to contract, and hence may be noticed the inclination to void the urine often, though in small quantities and slowly. The urination is, of course, quite painful. Sometimes particles of the deposit may be seen hanging to the long hairs around the external organ. Gravel is always more prevalent among males than females.

What to do.—Wash out the bladder with tepid water, which is easily done in case of the female. For the male it will be necessary to cut through the penis, as described for retention of urine. (See chapter on operations.) In order to dissolve the deposit, inject into the bladder a weak solution of hydrochloric acid, as follows:

No. 44.	1 Drachm hydrochloric acid, ½ Pint water, Mix.	No. 45.	20 Drops hydrochloric acid, 3 Drachms gentian, 1 Pint oat meal gruel, Mix.
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Give as one dose internally No. 45. Repeat it morning and night for a few days, and then change to No. 46.

No. 46.	½ Pound bi-carbonate soda, 4 Ounces gentian, 2 Pounds linseed meal, Mix.
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Give two tablespoonfuls No. 46 morning and night. Continue this for two or three weeks.

VIII. Calculi, or Stones in the Bladder.

Calculi, like gravel, are the product of a mechanical union of small particles of phosphates, etc., that accumulate in the bladder and other parts of the urinary apparatus. They are most common in localities where the water is hard, as it always is on a limestone formation.

How to know it.—The symptoms are almost exactly identical with gravel. To verify the diagnosis, make a manual examination by the rectum; the stone can be felt in the bladder.

What to do.—The stone or stones must first be removed by the method described in the chapter on operations. The subsequent treatment will be the same as for gravel.

CHAPTER IX.

DISEASES OF THE ORGANS OF GENERATION.

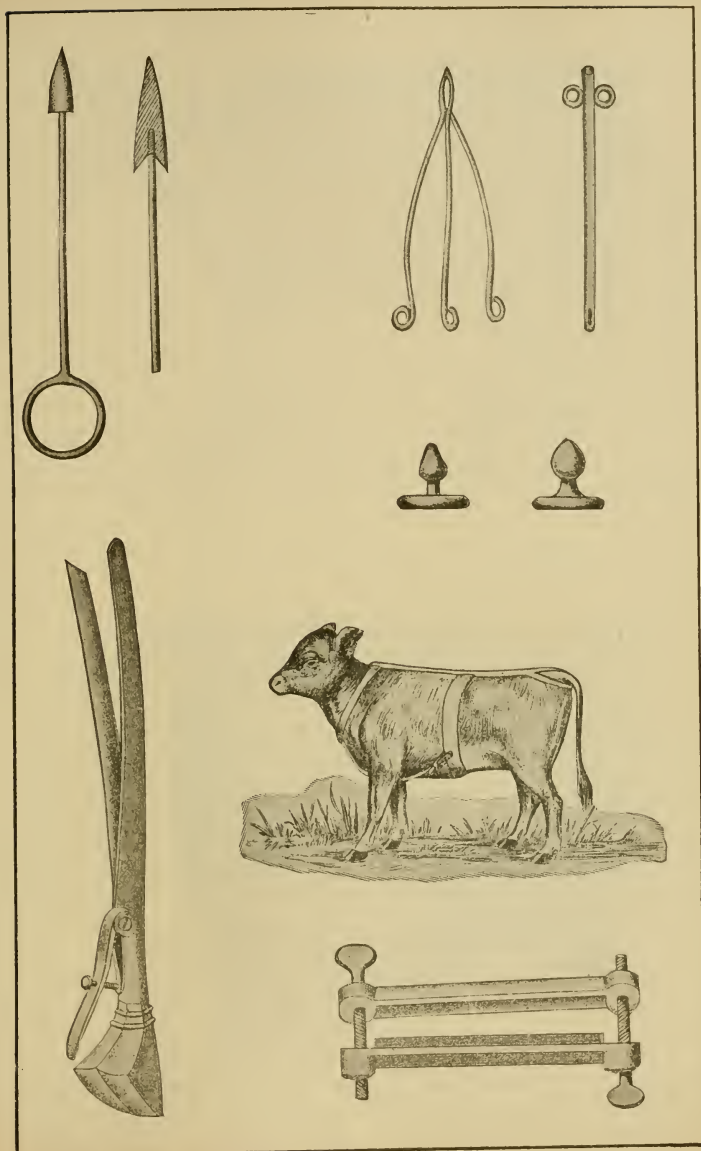
- I. MALPRESENTATIONS, ETC., IN PARTURITION.—II. PROLONGED AFTER-PAINS.—
III. RETENTION OF THE AFTER-BIRTH.—IV. ABORTION AND MISCARRIAGE.—
V. UTERINE HÆMORRHAGE, OR FLOODING.—VI. INVERSION OF THE WOMB.—
VII. METRITIS, OR INFLAMMATION OF THE WOMB.—VIII. PUERPERAL FEVER,
OR METRO-PERITONITIS.—IX. PARTURIENT APOPLEXY.—X. LEUCORRHEA, OR
WHITES.—XI. GONORRHEA.—XII. MAMMITIS, OR INFLAMMATION OF THE
UDDER.—XIII. SORE TEATS.—XIV. NYMPHIOMANIA AND STERILITY.

I. Malpresentations, etc., in Parturition.

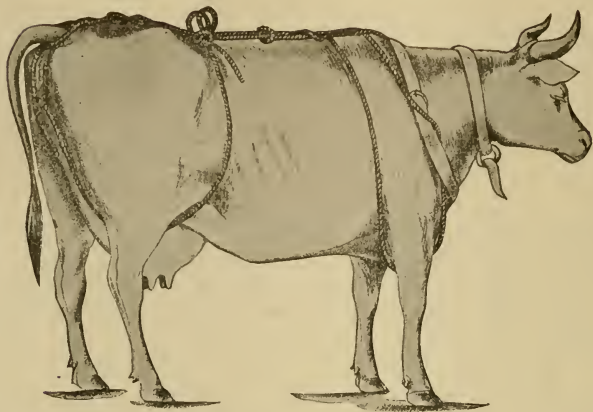
This, to the breeder at least, is the most important part of cattle pathology, aside from the contagious diseases. Oftentimes a valuable cow or calf, or both, are lost, when a knowledge of the subject would save them. A little timely aid, properly given, in a difficult case of parturition is invaluable, but if the assistance comes tardily, or is rendered in a bungling manner, the damage done may be irremediable and fatal.

In order to be able to recognize a malpresentation, some degree of familiarity with the natural presentation, and its attendant phenomena, is necessary.

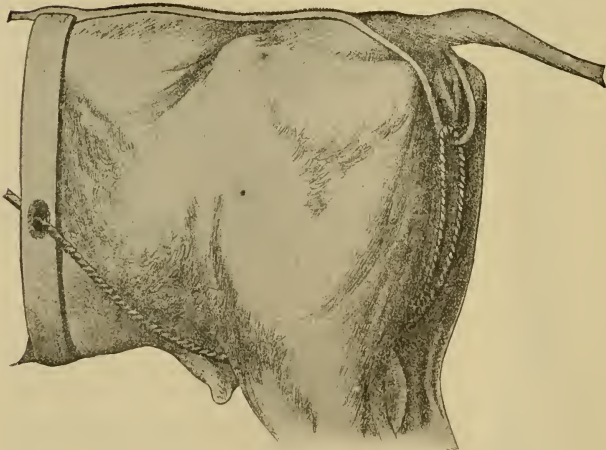
The period of gestation in cows is about nine months, sometimes a few days (or even weeks) more or less than this, but usually a few days more. The first calf, especially, is generally carried a few days longer. When the time for delivery approaches, the udder increases in size and fills, the vulva enlarges and thickens, the hips spread, and the space between the root of the tail and the joints of the haunch drops. The time being up, the cow endeavors to seclude herself and hide away from the others; the labor pains or throes come on gradually, increasing in force from time to time; in most cases, the cow lies down,—sometimes on one side, and sometimes on the other,—and occasionally stretches right out. The first object expelled is the water bag, which is usually about the size of a man's head; sometimes it breaks in the passage, at others it hangs unbroken, as low even as the hocks. The two fore feet next present, and then the nose lying between the feet. Three quarters of the labor is required to expel the head; the remainder, to pass the shoulders, after which the delivery is accomplished without further effort. The cow usually rises, and commencing immediately to lick the calf, in a very few minutes has him all licked off, when he dries quickly without chilling.



INSTRUMENTS USED IN DISEASES FOLLOWING PARTURITION.



SUPPORT No. 1 FOR PROLAPSED UTERUS.

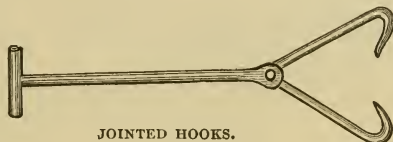


SUPPORT No. 2 FOR PROLAPSED UTERUS.

Unaided by the maternal instinct in this manner, the calf would be a much longer time in drying off, and in cold weather would become seriously chilled. The foregoing, as before intimated, is an outline of a natural case of labor, when "everything is right."

If the labor is severe and is prolonged more than half an hour, the cow should have help. The assistant should be the man whom the cow is accustomed to see; he should be very quiet and gentle in his movements, and have no spectators, neither human nor cattle. If in any case, a second person is present, there should be as little talking as possible. When the feet are properly presented, catch hold of them, one in each hand, and pull—not with anything approaching a jerk, but with a firm, even traction—at exactly the same time that the cow strains, and only at that time, relaxing the traction entirely during the intervals of quiet between the throes. Judgment and good common sense are required to manage a case well, and these must be the operator's main reliance; no printed directions can take their place.

In a case of malpresentation, the first thing to be done is to push the fœtus back out of the passage, in order to introduce the hand and arm



JOINTED HOOKS.

far enough to get hold of the parts that ought to come first, and so bring about a natural presentation. This is always a difficult task. If the cow is standing, the calf can be pushed back readily, but if she is lying down, the more fussing there is done the more the womb contracts, and the more difficult it becomes to push the fœtus in against the throes. The simplest, quickest, and easiest way is to fix a pulley and tackle around the cow's legs above the hocks and to something overhead, and by these



STRAIGHT HOOK.

means to elevate the hind parts so that the operator can get at the case, and push back and "turn" the calf. When all the arrangements for delivery have been completed, let her down, and she will soon return to

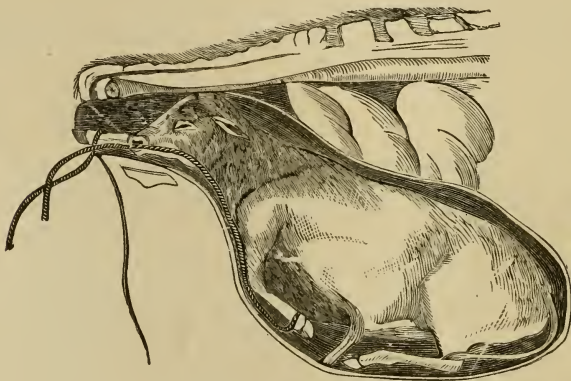
the labor pains. Work as lively as possible while the cow is elevated; it is an unnatural position, and under very unfortunate circumstances, and if she is kept in it long at a time very bad results might follow.

The instruments necessary are a piece of soft rope, (the size of a man's little finger and about ten feet long), a jointed hook, straight hook, concealed knife, and embriotomy knife. The last named, is a small curved blade fastened to a ring that fits over the big finger, so as to carry the knife in the palm of the hand.



CONCEALED KNIFE.

First Malpresentation.—If one fore foot and the nose are entered in the passage and the other foot bent back, the calf cannot be delivered without first bringing up the retracted foot into its proper position, on account of the obstruction which the shoulder would offer. Tie a small rope around the foot presented, in order not to lose it; then push the



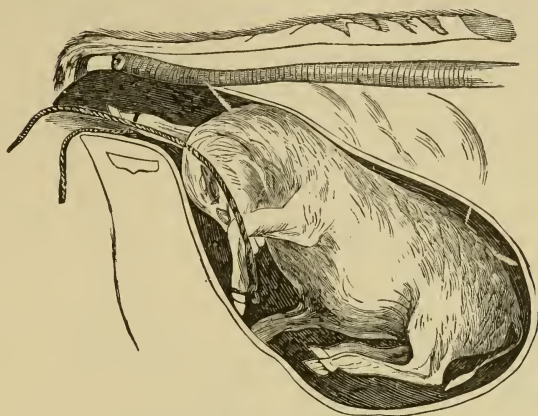
FIRST MALPRESENTATION.

One fore foot and the nose entered, the other foot bent back.

calf back, to allow the arm to be introduced and find the other foot; take in a noose of the rope, and put it over the foot as shown in the annexed cut; then—with the hand placed over the foot, so as to cover the toes, and thus prevent them from lacerating the womb—draw it up with the other hand. This accomplished, delivery will soon be effected.

Second Malpresentation.—When one foot is presented, the other foot and the nose being turned down, proceed in a manner similar to that just

described. Tie the rope to the foot presented, so as not to lose it, and

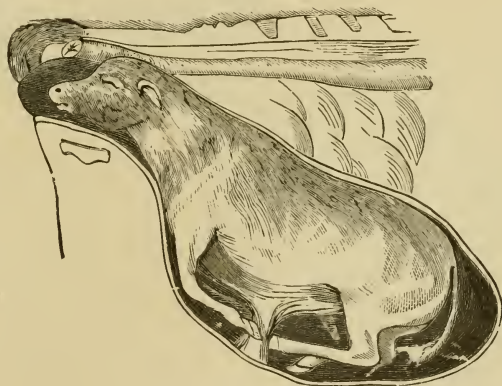


SECOND MALPRESENTATION.

One fore foot presented, the other foot, and also the nose, turned down.

push the calf back so as to catch the nose and raise it into the passage ; then get the other foot in the way directed for the first malpresentation.

Third Malpresentation.—When the nose is presented and both feet bent



THIRD MALPRESENTATION.

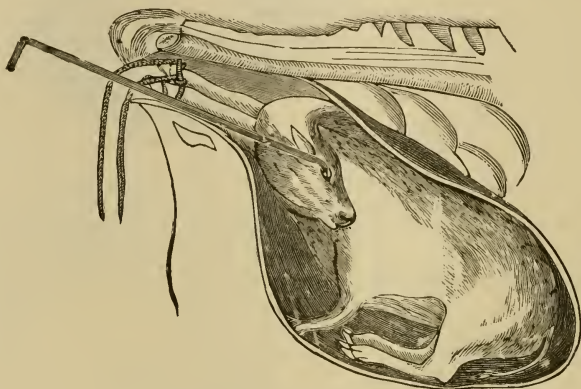
The nose presented, and both fore feet bent back.

back, the head may be entirely expelled, the neck being in the passage and the shoulders against the rim of the pelvis. If the fœtus remaine

long in this condition, the head swells so as to render it utterly impossible to push it back, and the calf dies of course,—he is choked to death. In this extreme, the only feasible plan is to cut the head off, then push the body back and get the feet as directed for the first malpresentation. Such a case once occurred in the practice of the writer; it was managed in this way, securing delivery without trouble, and saving the cow.

The foregoing applies only when the head is swollen. When this is not the case, push the head back and bring up the feet as before described.

Fourth Malpresentation.—In this the fore feet are both presented, but the head is turned back against the side. Tie the rope to the feet, and carry a piece of it in, with a view of getting it into the mouth and



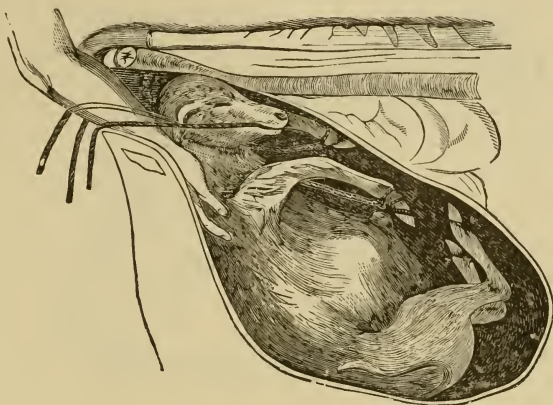
FOURTH MALPRESENTATION.

The fore feet in the passage, the head turned back on the side.

around one of the jaws. Failing in the latter effort, hook the straight hook into the eye socket, and then push the feet back, till the head can be brought into the passage.

Fifth Malpresentation.—Here, the fœtus is lying on his back, with the poll presented and the feet bent back upon the belly. Delivery may be made in this position, but the nose and feet must be brought into the passage first. To do this, pass in a noose for each foot, and another for the upper jaw, putting it in the mouth; then push the calf back, so those parts can be liberated and brought up. Carefully guard the womb from laceration by the toes, in all cases. When in a favorable presentation, let an assistant pull, while the main operator raises the withers of the fœtus over the rim of the pelvis.

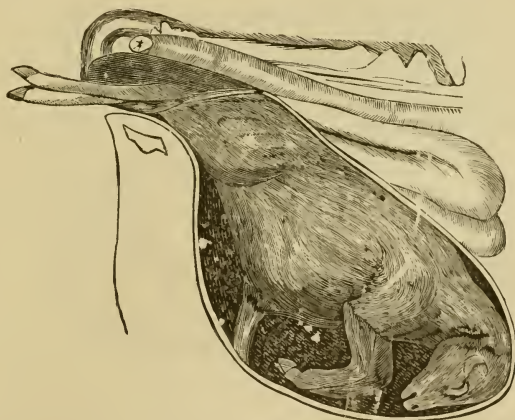
Sixth Malpresentation.—Both hind feet are in the passage, the calf's back being against the loins of the mother. Delivery is not necessarily



FIFTH MALPRESENTATION.

The fetus on his back, with the poll presented, and both fore feet bent back.

difficult, but when once well started, it is very desirable to hasten it to the utmost limit of prudence, as there is danger of the calf suffocating.

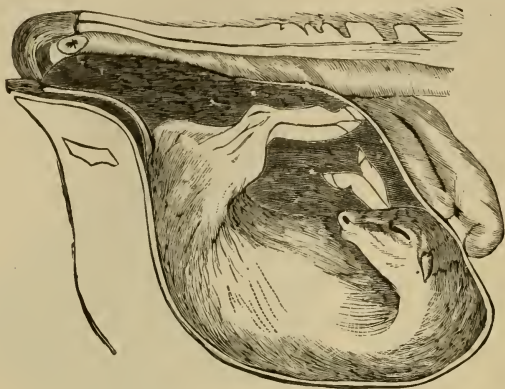


SIXTH MALPRESENTATION.

The hind feet both in the passage.

Seventh Malpresentation.—The breech is presented, and the hind feet are up against the cow's back. The feet must be drawn back into the

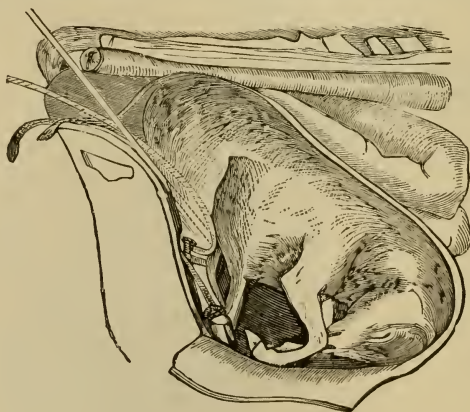
passage. Pass in the rope, take a noose around the hocks, and pull the fœtus down so as to get the noose around the feet and draw them back ;



SEVENTH MALPRESENTATION.

The calf lying on his back, the hind feet up against the cow's back, and the breech presented,

this done, and the points of the buttocks being raised over the rim of the pelvis at the proper time, the calf may perhaps come without further



EIGHTH MALPRESENTATION

The breech presented, with the back up against the loins of the mother, and the feet bent downwards

trouble. But if otherwise, persevere, and turn it into the position seen in the cut for the sixth malpresentation. Failing in this, and as a last

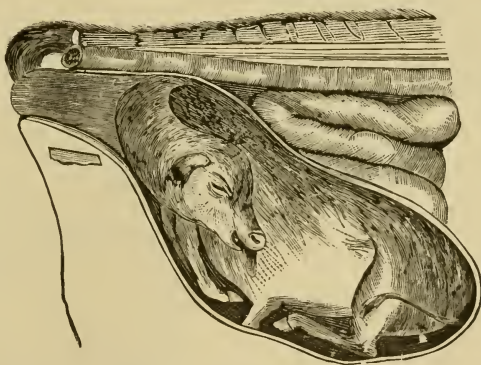
resort, it may be necessary to cut the calf up, and take him away piece by piece, with the concealed knife. The latter operation requires considerable skill, in order to avoid wounding the womb and vagina. It cannot safely be attempted, except by an expert.

Eighth Malpresentation.—This is a breech presentation in which the calf's back is up against the mother's loins, and the feet are bent downwards. This is considered to be the hardest position of all to rectify. Pass in the ropes, and take a noose around the hocks, and then around the feet; then, by elevating the cow very high behind and pushing back the fœtus, and drawing up the legs and feet into the passage, it can be delivered.

Ninth Malpresentation.—The neck is presented in the passage, the head being bent around to one side and the legs down against the belly. First, get the feet up as directed for the first three malpresentations; then turn the head into the passage, as directed for the fourth.

We need hardly say that before introducing the hand and arm, in any of the cases we have mentioned, they should be thoroughly anointed with lard or oil. The exact position of the fœtus should be determined beyond a doubt before attempting to change or "turn" it.

These nine malpresentations do not comprise all the difficulties attending parturition; for there may be abnormal developments of the fœtus.

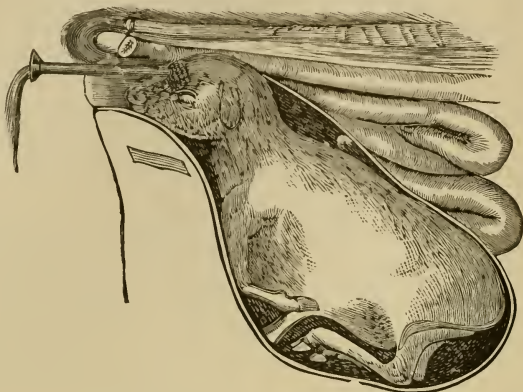


NINTH MALPRESENTATION.

Neck presented, with the head turned against the side, and both feet down.

rendering it a mechanical impossibility to effect its delivery alive. By far the most common phenomena under this head are hydrocephalus (dropsy of the brain) and ascites (dropsy of the belly.)

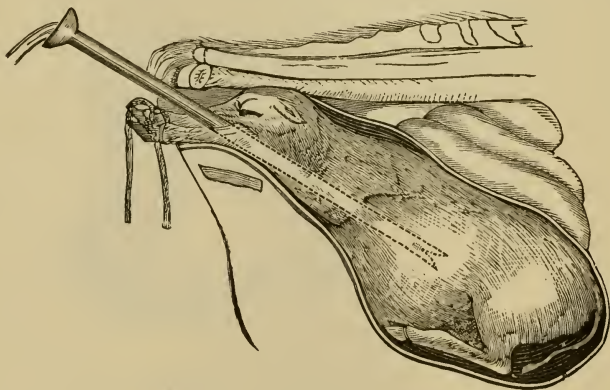
Hydrocephalus.—This occurs mostly in old, thin cows, but sometimes also in excessively fine-bred ones. The head must be tapped with the



HYDROCEPHALUS, WITH MALPRESENTATION.

trochar and cannula, thus evacuating the water; then crush in the skull, and deliver.

Ascites.—Carry in the concealed knife, and with it tap the belly and



ASCITES, OR DROPSY OF THE BELLY.

The presentation is natural.

let the water out into the mother's womb. If this is not successful, use a long trochar and cannula, as shown in the cut.

The cow, dying, to save the calf.—In case of serious malformation of the cow, when all hope of saving her is given up, and the calf is still alive but cannot be delivered, resort should be had to the Cæsarian operation. (See chapter on operations.)

Some treatment,—or, rather, special care—is very necessary both before and after parturition. If the delivery is easy, a warm bran mash with a little salt in it is soothing and slightly nutritious. The cow should be dieted for a few days before calving, to loosen the bowels; if on hay, give roots and bran. Avoid having breeders too fat, the other extreme being just as bad. If too fat, puerperal fever is much more apt to follow; if too thin and weakly, the placenta is sure to be retained. Avoiding both these extremes, have them in middling flesh up to within a month of calving; then increase the feed up to within two days of that time, so as to have them in a thriving condition. If the cow is fat, it is a good plan to give, two weeks before calving, and repeat a week before, half a pound of epsom salts in a quart of water, to loosen the bowels.

If delivery is long and exhausting, give a pint of warm ale during its progress, and again afterwards. If the udder fills very full before calving it is well to milk a little to relieve its painful tension. In all cases, milk the cow immediately after calving, while she is drinking her slop, and feed the calf, before he gets up, about a pint of the milk, giving the rest to the cow. It will act upon her as a healthful laxative. Inasmuch as the milk at this time is very different from what she ordinarily gives, there is a very little danger of begetting the habit of milking herself.

The milk, at first, is rather thick and yellow, and is not fit to use for family purposes under three or four milkings. Some people indeed have a prejudice against using it under two weeks; nevertheless, except for drinking, it is good for all purposes after the third milking, provided there is no disease in the cow.

II. Prolonged After-pains.

These sometimes occur after protracted and painful delivery, from failure of the womb to contract, or from retention of the after-birth,—most commonly in weak, thin, old cows. For treatment, injections of cold water thrown up the vagina will usually suffice. They should not be allowed to continue, as they are apt to lead to inversion of the womb.

III. Retention of the After-birth.

When the placenta or after-birth is retained, mechanical means are necessary to remove it; for it becomes a foreign body as soon as the fœtus is delivered, and begins at once to decompose, and the impure matter being absorbed into the circulation, the general health of the animal suffers decidedly.

It is best to let the placenta remain till the end of the second day, or

beginning of the third, to soften a little. It may then, perhaps, come away of its own weight; if not, it is easily removed by inserting the hand and arm to the shoulder, and then with the other hand, applying gentle traction to the hanging membrane; at the same time take each cotyledon or button by which the placenta is attached to the womb, in turn, and by pinching it a little between the thumb and fore finger, it will detach from it, much as in unbuttoning a garment. Great care is required not to pull off one of these cotyledons, or the resulting hemorrhage might prove fatal. If, however, this should be done by mischance, cold water thrown over the loins will be the proper treatment.

IV. Abortion and Miscarriage.

Premature expulsion of the fœtus is called abortion in the earlier periods of gestation, and miscarriage or premature labor in the later ones. It not infrequently takes on an enzoötic character, and by running through a whole herd entails enormous loss on the stock owner. This tendency, as was remarked in Chapter I of this Part, is stronger among cows than any other of the domestic animals. It is usually explained by attributing it to sympathy, using the words pathologically, but it in reality occurs from three distinct sources, viz.: Habit, accident, and infection. In the latter case it is very often enzoötic.

Causes.—The most common causes are accidents, or violence of some kind,—being hooked and pushed about by other cattle, or kicked and clubbed by brutal herdsmen; jumping, leaping, falling, etc.; ergot in the hay or other fodder, such as has been badly harvested or grown in a wet season, especially on low, swampy ground. From habit a cow that has aborted once is apt to repeat it at about the same stage of gestation, due probably to a weakened condition of the genital organs and an unnaturally sensitive nervous system. Enzoötic abortion is always due to infection, the cause being bacterial. Two different germs are thought by the best authorities to be the active agents, viz.: *Leptothrix vaginalis* and the *penicillium glaucum*. These germs may be carried to a stable in many ways, and being raised in dust and falling or lodging on the external genitals of a pregnant cow, set up sufficient irritation in the vagina and uterus to interfere with the nutrition of the fœtus, causing it to perish, then abortion is inevitable.

How to know it.—There will be dullness, suspension of rumination, anxiety in the countenance, separation from companions; at length, a small water bag will be passed, and a little later a fœtus. Or, perhaps, all that may be noticed, to indicate something wrong will be a tiny fœtus found somewhere. More or less discharge will follow. It will be of a bloody, mucous character, and is likely to become purulent after a few days.

Treatment.—For the original case (in which the mischief is nearly always completed before discovered), nothing special can be done, except to

syringe the parts out well with tepid water, and follow this with a carbolic lotion, viz.:

No. 47.	$\frac{1}{2}$ Ounce carbolic acid,	
	$\frac{1}{2}$ Gallon water,	Mix.

Inject a little twice a day. Continue it a week or more.

Prevention.—This is really the important part. Isolate the cow that has aborted immediately, burn the afterbirth, all soiled litter and scald any blankets that have been used around her. Now, not knowing where the germs may have lodged, waiting for something to stir them up and infect others, it is proper to remove the cattle, sweep and scrape the stable thoroughly, floors, walls and ceilings, then shower them with formaldehyde and water—one of the former to one thousand of the latter, then whitewash the ceiling and walls. Keep the cow that has aborted separated from pregnant ones for several weeks. Otherwise, some of her companions would probably abort from two to six weeks later. As general precautions, prevent violent commotions among the cows when out of the stable, and never allow them to be run by boys or dogs, but drive them as quietly as possible. Always shut up a cow when bulling; her jumping on the others, or, instead, being ridden by them is apt to injure them and her alike.

The feeding of hemp seed deserves considerate attention, owing to the experience of recognized authorities on breeding. It is given in pint feeds once a day, with other food, from the time immediately preceding the bulling season through four or five months. As to the general diet, feed well so as to keep cows in good, strong condition, but avoid obesity.

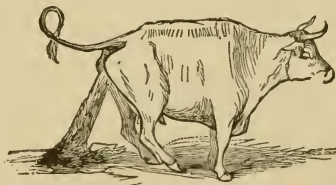
V. Uterine Hemorrhage or Flooding.

Bleeding from the womb or vagina sometimes follows protracted labor, from injuries to those parts by carelessness or accident during parturition; or it may result from unskillful removal of the placenta. The continuance of bleeding is due to the failure of the womb to contract, as it should do, after delivery. It is called flooding on account of its coming away in such large quantities, the womb-full being evacuated at a time.

What to do.—Throw cold water, by the bucketful, over the loins; cool the hand and insert it into the womb, which will sometimes cause the latter to contract upon it. If these means prove insufficient, inject cold water into the womb, with a suitable syringe.

VI. Inversion of the Womb.

Following immediately upon parturition, after-pains sometimes come on so violently that the womb is forced right out through the vagina, and is turned inside out, and lies or hangs behind the cow a pink, bag-



EXAGGERATED ILLUSTRATION OF UTERINE HEMORRHAGE.

like substance covered with cotyledonous (mulberry-like) excrescences all over the surface.

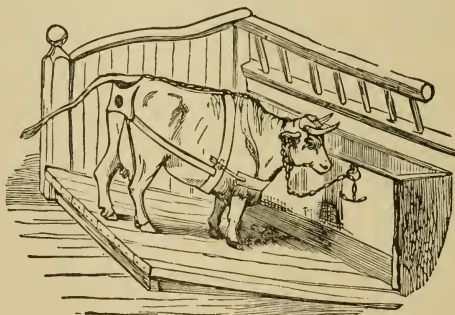
What to do.—If dirty, take it up on a clean sheet, and wash it with tepid water with a little alcohol in it—a wineglassful to a pint of water.



INVERSION OF THE WOMB.

(If the placenta is still attached, remove it as directed in Section III.) Sponge it over with laudanum, and carefully return it. This is an exceedingly delicate task, though not difficult otherwise; the utmost care is necessary to avoid punching the fingers right through the membranes, which would cause death. Find

the most dependent portion, then place the clenched fist beneath it, and let the womb fall down over the hand and arm as it is raised; and, with the parts in this position, promptly insert the arm at full length into the body of the cow, being very careful not to use undue violence. The uterus will generally suck down into its proper place without any difficulty, but if necessary to manipulate the walls of the vagina somewhat, this may be done—always with extreme care and the minimum amount of force that will accomplish the object. Then place the cow in a stall



TO PREVENT INVERSION OF THE VAGINA.

where the hind feet will be at least six inches higher than the forward, and apply a harness and compress over the external opening, as shown in the annexed cut. Or a rope, twisted as shown in the smaller cut, may be used, the object in either case being to prevent a recurrence of the displacement.



TWISTED ROPE.

To tie over the vulva, and thus prevent inversion of the womb.

If straining is violent and continues any length of time, give internally the following mixture:

No. 48.

1 Ounce chloral hydrate,
1 Pint water,
Mix.

Give as one dose; if necessary, repeat it in half an hour.

VII. Metritis, or Inflammation of the Womb.

This affection is not very often seen in the cow, owing to her phlegmatic temperament, and her proneness to other complications, arising at an earlier stage, in connection with parturition. It is the result of injuries to the womb during difficult parturition; it may develop also from a cold caught at that time. The inflammation soon extends and involves other parts, making a very serious condition indeed. See further in the next section.

VIII. Puerperal Fever, or Metro-Peritonitis.

This disease is often confounded with parturient apoplexy, so that, notwithstanding the difference between the two conditions, they are mistaken one for the other. Puerperal fever is erysipelatous inflammation of the uterus and peritoneum, and may affect cows of all ages. The antecedent facts will usually be found to be difficult parturition, exposure to cold storms or extremes of temperature, retention of the placenta, or overdriving prior to calving, and the like circumstances. Thin, poor cows that have been changed suddenly from a dry, short pasture to rich succulent feed at or near the time of calving, are especially apt to have it. It may come on at any time from a few hours after calving up to the third or fourth day.

How to know it.—High fever, with all of its attendant symptoms, such as dry, hot nose, horns and extremities hot or cold; capricious appetite, with rumination suspended; colicky pains; kicking at the belly; getting up and lying down frequently,—sometimes, remaining on the knees several minutes. The head is turned towards the flanks; the pulse is quick, hard and wiry; the respirations are accelerated, short and confined to the thorax, so as to avoid moving the abdomen as much as possible; the belly is tucked up, the urine is scanty and high colored, and usually there is constipation. All the symptoms, and especially the belly pains, increase; prostration comes on; finally, stupor (coma) sets in. Death soon follows.

Post mortem examination shows all the evidences of inflammation of the womb and peritoneum, with purple spots here and there; and the brain is visibly affected, showing ecchymosed spots, etc.

What to do.—Give recipe No. 26, and supplement its action with injections of soap and water. Give No. 42 every two hours, till the pulse is improved. If in the very early stages, a little blood may be drawn, but this is not allowable after the first day. If the stupor comes on before the purgative can be gotten down, give the latter through the stomach pump, to avoid the danger of letting it run down into the lungs. Apply

blisters—mustard paste or flies—to the belly. If no symptoms of purgation show themselves in eight or ten hours, inject No. 40 under the skin every half hour till the bowels have moved. If constipation is still obstinate, a pint of tepid water may be injected into a vein.



USING THE STOMACH PUMP.

Manner of giving medicine or food during stupor.

Convalescence will be indicated by a return to sensibility, cessation of pain, purgation, copious secretion of urine of a good color, and a return of strength. When these symptoms are noticed, give No. 19, repeating it three or four times a day.

IX. Parturient Apoplexy.

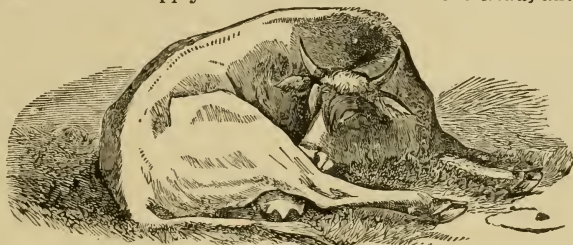
This is a blood disease affecting cows of a plethoric habit at time of calving. It is never seen following difficult or protracted labor, uterine hemorrhage (flooding), abortion, nor the retention of the placenta. There must be a constitutional tendency to congestion of the brain, coma and apoplexy. The first attack is usually fatal; even if not so, the trouble is very likely to recur at the next or some subsequent calving.

How to know it.—There is at first a staring, wild look about the eyes, disinclination to move, loss of milk, and increased temperature; but these symptoms are seldom so marked as to attract special notice. They are followed by a staggering gait and weakness across the loins, till suddenly the animal falls, when the eyes are found to be bloodshot and glassy, the pupils dilated and the lids twitching. The mucous membranes become purple; she gets perfectly blind and comatose (stupid); the head is usually turned back to the side; the pulse gets gradually slower, fading into imperceptibility; the breathing is slow and stertorous. In this stage the pupils contract, the temperature falls decidedly, sometimes as low as 95°. The udder becomes hard and unyielding; the paunch fills with

gas, causing marked interference with the breathing; convulsions set in, and death soon follows.

The post-mortem shows a fat, full body, blood vessels full of fluid, black blood, and purple spots on the brain and spinal column and in other parts of the body. There are many other abnormal appearances in the brain, most of which can only be distinguished by an expert.

What to do.—Prevention is the main thing. If the cow is manifestly plethoric, give light, soft diet, with laxatives (No. 8 is excellent) once or twice a week for three weeks before calving. When the attack comes, if the cow is seen in the first stage, when the pulse is always full, bleed freely, and give recipe No. 26; after two hours give No. 20, repeating the latter every two or three hours as long as necessary. Give injections also every few minutes. Apply cold water and ice to the head, and heat in



PARTURIENT APOPLEXY.

the form of hot rugs, hot smoothing irons, etc., to the body. If the purgative does not work, give a hypodermic injection of No. 40, repeating it every two hours. If these means fail, open the jugular vein, and inject a pint of clean, tepid water. During convalescence, treat the same as for puerperal fever. If she recovers, do not breed her again, but sell her to the butcher; for, as before mentioned, it is almost certain to occur again, and at no distant day to end in death.

If it is necessary to give any drenches during the coma, use the stomach pump, to guard against turning them in upon the lungs.

PARTURIENT PARESIS OR MILK FEVER.

Inflate the udder with pure air using an instrument especially made for the purpose, or in the absence of this use a bicycle pump by appending a reducer so that entrance may be made into the end of the teat. Disinfect adjacent air with carbolic acid and water. Give the cow No. 26.

X. Leucorrhœa, or Whites.

This is catarrh of the vagina and womb, with a chronic discharge of a muco-purulent, white fluid that hangs around the vulva and tail, and has a very offensive odor. It is not attended with serious constitutional disturbance, but sometimes causes nymphomania or "bullers." Such cows rarely breed, and even if they do so, are apt to abort. Sometimes the discharge is so profuse as to keep the cow poor.

What to do.—Syringe out the parts with tepid water, and inject lotion No. 47, repeating this twice a day. Feed on nutritious but light diet, and give No. 21 in the feed.

XI. Gonorrhœa.

This is catarrh of the generative parts of the bull,—little ulcers or chancres in the sheath and on the penis, with a whitish discharge, which is chronic.

How to know it.—Painful urination is the most characteristic symptom ; with all his frequent efforts, only a few drops are passed, and those not without great uneasiness, which is further manifested by his stepping forward and back or from side to side, and by raising the hind feet, lashing the tail, etc.

What to do.—Suspend all service, and give him the laxative recipe No. 8, and when the bowels return to their normal condition give No. 21 in the feed, repeating the latter morning and night, for three or four weeks. Draw out the yard with soft linen cloth, and bathe all affected parts with the following lotion :

No. 49.	4 Ounces spirits of camphor,
	1 Ounce sugar of lead,
	2 Drachms sulphate of zinc,
	1 Quart soft water,
	Mix.

Continue the application, once a day, till cured, and do not let him serve a cow, for the reason that it is contagious. If any chancres are seen, touch them once a day with lunar caustic. Feed on green food, if possible.

XII. Mammitis, or Inflammation of the Udder.

This is most common after a parturition which occurs before the secretion of milk has assumed a normal condition, especially in the case of heifers at the first calving. Sometimes, it has no connection with calving, but is contracted by lying on cold, damp ground, or in the case of middle-aged and old cows, develops in hot weather, taking on the form of garget or curdled milk. Cows in high condition are the most subject to it, the attack being usually induced by driving them until overheated.

The inflammation, in some cases, will subside and go away, and the milking function go on as before with very little loss ; in others, it goes on to suppuration in one or more quarters of the bag, or even to mortification.

How to know it.—The type of mammitis that takes on the active inflammatory character is ushered in with a shivering fit, which is succeeded in a short time by fever and dullness. The bag becomes hot and hard, red, swollen and sore. It being so painful to the touch, the cow is very

verse to being milked. The milk is often curdled, and sometimes bloody. The trouble may stop here and terminate in resolution, or it may go on to suppuration, the pus in some cases discharging inside and coming away with the milk, and in others through an opening on the outside. Again, it may not suppurate at all, but become indurated and remain permanently enlarged, or gangrenous and slough off.

The milder type of mammitis, that which is not connected with parturition, but is simply curdled milk or garget, yields readily to treatment.

What to do.—If dependent upon calving, and the cow is fat and feverish, give recipe No. 8. Foment the bag with hot water several times a day, and as often as three or four times a day remove the milk that does form, and apply the following lotion :

No. 50. 4 Ounces gum camphor,
 1 Pint olive oil,
 Mix.

Rub well in three times a day. If the inflammation does not go out by the time purgation ceases, give No. 19, repeating it morning and night for a week or two. If the case goes on to suppuration, and it breaks on the outside, foment the bag, and inject recipe No. 9, two or three times a day. In all cases where there is much swelling, support the bag by a bandage passed around the body over the loins. If a quarter sloughs off, dress the wound with No. 9, and give internally the following :

No. 51. 1 Ounce sulphate of soda,
 2 Drachms nitrate of potash,
 Mix.

Give as one dose in a bran mash, and repeat it morning and night for a week or two. Isolate the patient, on account of the smell.

When it is merely a case of curdled milk (garget), give a tablespoonful of saltpetre night and morning in a bran mash, and milk her with special care, to make sure of getting all the milk away.



METHOD OF SUPPORTING
THE UDDER.

XIII. Sore Teats.

Cows' teats are very apt to become chapped, cracked and very sore, rendering the milking exceedingly painful to the cow and very annoying to the milker. Unfortunately, the latter is often so thoughtless as to fly into a passion and abuse the cow. Great patience and kindness should always be exercised in such cases, the milker taking plenty of time to soften the sore teats well with the milk before attempting to squeeze them.

When done milking, anoint them nicely with the following mixture :

- No. 52. 1 Ounce alum,
 1 Drachm carbolic acid,
 4 Ounces lard,
 Powder the alum and mix.

Or, instead, this may be used :

- No. 53. $\frac{1}{2}$ Ounce tannic acid,
 1 Drachm carbolic acid,
 4 Ounces lard,
 Mix.

Little pea-like tumors sometimes grow in the milk passage, in the teat, eventuating, in some cases, in its complete obstruction, and the subsequent loss of that quarter. Many expedients have been tried for the cure of this troublesome condition—such as teat siphons, probes, bistouries, needles, etc.—but all to no avail, for the teat very soon gets sore, and milking becomes dangerous, if not well-nigh impossible. The only feasible way of managing the case is just to let it go till the cow goes dry, milking that quarter as well as possible without any instrumental aid ; and then to cut into the teat, remove the excrescences, and let the wound heal over a silver probe. If this is properly done, the teat will be as good as ever.

XIV. Nymphomania and Sterility.

Nymphomania is chronic inflammation of the clitoris, giving rise to a constant desire for the male. Such cows take the bull at any time, but rarely conceive, and even when they do so, are almost sure to abort. They are called “bullers.” It often happens that they are barren naturally, twins being especially prone to that condition. Sometimes, high bred cows will not breed to a high bred bull, yet will do so to a mongrel, especially a young bull.

What to do.—For cows naturally barren nothing can be done. For others the difficulty can often be overcome by reducing them in flesh (for they are nearly always fat), and by judicious management. Keep them in a short pasture for a few weeks, and give them a handful of Glauber’s salts every second day. At the proper time, put them to a young, vigorous bull, one or two leaps being sufficient. If this does not succeed, try a mongrel bull. If the cow is continually riding the other cows, keep her to herself, if possible, and feed from half a pint to a pint of hemp seed once a day for two months. In some cases hemp seed seems to have a magic effect. Feed it both before and after the service—beginning say three weeks before coming in heat, and continuing it right along till she conceives. If the cow is thin in flesh, fatten her up a little, even if she has to be shut up to do this.

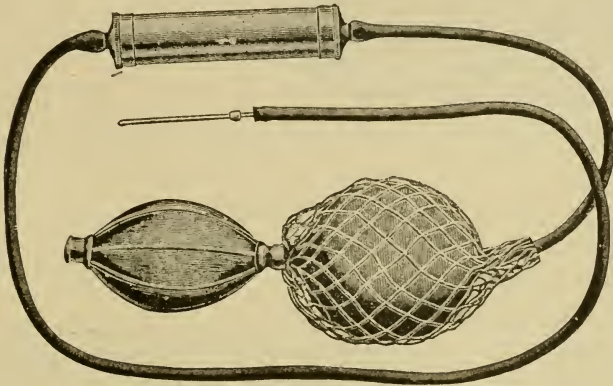
CHAPTER X.

MILK FEVER—ITS SIMPLE AND SUCCESSFUL TREATMENT.

I. PRELIMINARY STATEMENT.—II. NAME AND SYNONYMS.—III. DESCRIPTION OF DISEASE.—IV. CAUSES.—V. HOW TO KNOW IT.—VI. THE NEW AIR TREATMENT.—VII. PREVENTION.

I. Preliminary Statement.

Milk fever is a very common, and until recently a frequently fatal, disease affecting cows in all the large dairy districts of this and other countries. As it usually attacks the best milking members of the herd and at a time when the milk flow is the heaviest, the malady is one which



Apparatus for Treatment of Milk Fever, for the injection of sterile atmospheric air into the udder.

has caused very severe losses to our dairy industry. It is therefore of the greatest economic importance that every milk producer acquaint himself with the present extremely successful methods of treating this disease, especially the injection of filtered atmospheric air into the udder. This form of treatment has been adopted within a comparatively recent time, and, in view of the uniform success that has followed, every dairyman should become familiar with its use and should provide himself with a suitable apparatus for its application, especially if he is located where the services of a competent veterinarian can not be secured. This method of dealing with the disease does not make the assistance of the veterinarian

undesirable, in case it is obtainable, as the professional man may frequently be of the greatest assistance in treating complicated symptoms, should they arise.

II. Name and Synonyms.

The common name for this malady—milk fever—is an erroneous and misleading one, as in reality fever is usually absent; instead, there is generally an actual reduction in body temperature. A far better and more distinctive term and one that describes the actual condition much more precisely is parturient paresis. The disease has also several other names in various parts of the country, such as calving fever, parturition fever, parturient apoplexy, parturient collapse, puerperal fever, vitulary fever, and dropping after calving.



MILK FEVER—FIRST STAGE.

III. Description of Disease.

Milk fever is a disease of well-nourished, plethoric, heavy-milking cows; it occurs during the most active period of life (fourth to sixth calf), and is characterized by its sudden onset, and the complete paralysis of the animal with loss of sensation, and by following closely the act of calving, or parturition, terminating in a short time in recovery or death. One attack predisposes the animal to a recurrence of the trouble. While this disease may occur at any time during the whole year, it is seen principally during the warm summer season. The affection is almost entirely confined to the cow, although a few cases have been reported in the sow and goat. Sheep are entirely free from the disease.



MILK FEVER—SECOND STAGE.

IV. Causes.

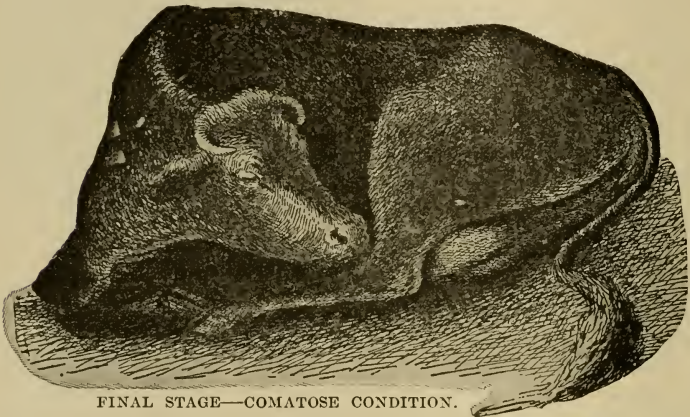
There are few diseases among our domesticated animals regarding the exact cause of which more widely different theories have been advanced than that of milk fever. The causes may properly be divided into two kinds—predisposing and direct. Experience shows one of the most prominent predisposing causes to be the great activity of the milk-secreting structure, namely, the udder. This organ is most active after the fourth, fifth, and sixth parturition, and this is the time of life when the vast majority of cases occur. The disease is almost unknown in heifers with the first calf and decreases in frequency steadily after the most active milking period is past. It is rarely, if ever, met with in pure beef breeds, such as the Shorthorn, Angus, and Hereford, while its main inroads are made into the heavy-milking breeds, such as the Holstein, Jersey, and Guernsey.

Regarding the direct cause of milk fever numerous theories have been advanced by various investigators, but only to be abandoned as further discoveries in pathology were made. Thus Schmidt, of Mühlheim, basing his theory upon the striking resemblance of the symptoms of milk fever to those of sausage poisoning, claimed that the former was due to an auto-intoxication, produced by the absorption of toxins from the uterus.

V. How to Know It.

This disease in its typical and most common form is comparatively easy to diagnose and one which almost every dairyman knows immediately before the arrival of the veterinarian. It usually comes on within two days after the birth of the calf and is practically never seen after the second week. In isolated instances it has been observed a few days before calving. At the commencement of the attack there is usually excitement; the cow is restless, treads with the hind feet, switches the tail, stares anxiously around the stall or walks about uneasily. She may bellow occasionally, show slight colicky symptoms, and make ineffectual attempts at relieving the bowels. These symptoms are rarely recognized by the owner, but they are followed within a few hours by beginning paralysis, indicated by a staggering gait, especially in the hind legs, and by weakening of the knees and fetlocks in front. The patient now becomes quieter, the gait more staggering and weak, and finally the animal goes down and is unable to rise. The paralysis by this time is general, the calf is unnoticed, and the cow lies perfectly quiet with the eyes partly closed and staring and showing a complete absence of winking when the eyeball is touched. She is absolutely unheeding of her surroundings and flies may alight with impunity on all parts of the body without causing the slightest movement to dislodge them. While down the patient assumes a very characteristic position, which is of great

aid in diagnosis. The head is turned around to the side (usually the left) and rests on the chest, causing a peculiar arching of the neck. If the head is drawn out straight, it immediately flops around to the side again when the force is removed. The body usually rests slightly to one side, with the hind legs extended forward and outward and the fore legs doubled up in their normal position. There is paralysis of the muscles of the throat, so that swallowing is impossible, and in case drenching is attempted there is great danger of the fluids going into the lungs and setting up traumatic pneumonia. In fatal cases the animal may remain perfectly quiet and die in a comatose condition from complete paralysis of the nervous system, but more frequently there is some



FINAL STAGE—COMATOSE CONDITION.

agitation and excitement prior to death with tossing about of the head. Death, like recovery, usually occurs in from eighteen to seventy-two hours after the onset of the malady.

VI. What to Do.

To Andersen, of Skanderborg, belongs the credit for first having made use of plain atmospheric air, although Schmidt had previously recommended the admittance of air with the potassium iodide solution for the purpose of obtaining greater diffusion of the liquid. Andersen first injected air along with sterile water and then by itself. The results were astonishingly successful. Thus Schmidt reports that out of 914 cases treated in Denmark, 884, or 96.7 per cent, were restored to health. The record of 140 of these animals shows that recovery occurred in the aver-

age time of 6 2-3 hours. Of this number 25 cases required a second injection, while in 3 of the latter number it was necessary to give a third treatment before they were able to get upon their feet. The treatment is also practically harmless, as the statistics of the above-mentioned 914 patients show that only 1 cow was affected with a severe attack of caked bag after this treatment, while in 4 other cows a milder inflammation of the udder was apparent.

Previous to making the air injection, the hands of the operator should be thoroughly cleansed and the udder should receive the same careful antiseptic treatment as has been recommended in discussing the injection of potassium iodide. Soap and water should be applied to the teats and udder, after which they should be carefully disinfected with a 5 per cent solution of carbolic acid (3 tablespoonfuls of pure carbolic acid to 1 quart of water). A clean towel should then be placed under the udder to prevent the teats from coming in contact with dirt or filth of any kind. The milking tube, before it is placed in the teat, should have been perfectly sterilized by boiling for fifteen minutes, with the lower hose and cap of the cylinder attached, and the apparatus should be wrapped in a clean towel, without touching the milking tube, to prevent contamination before use. If the apparatus has been subjected to this treatment shortly before, and it is desired to disinfect only the milking tube, the latter may be placed in a 5 per cent solution of carbolic acid for five minutes. It is then carefully inserted into the milk duct of the teat without emptying the udder of milk. Air is now pumped into the udder. Slight massage or kneading of the udder will cause the innermost recesses of the milk tubules to become distended with the injected air. After one-quarter of the udder is well distended the milking tube is removed, care being taken to prevent the outflow of air by having an assistant tie a broad piece of tape about the teat at the time the milking tube is withdrawn. The same treatment is repeated with the other three teats until the udder is satisfactorily distended. In case the air becomes absorbed and no improvement is noted within five hours, a repetition of this treatment should be made under the same antiseptic precautions as at first. The tape should be removed from the teats two or three hours after the cow gets on her feet, the constricting muscles at the tip of the teats being now depended on for retaining the air. In this manner the air may be left in the udder for twenty-four hours, and when recovery is assured, it should be gradually milked out. It is needless to say that the calf should not be permitted to suck during this period.

Inflammation of the udder (caked bag) is avoided if the milking tube is thoroughly disinfected before each application, and if the cow's teats and bag and the hands of the operator have been properly cleansed.

While this method of treating milk fever is a comparatively easy one for a farmer or dairyman to adopt, he can not expect to have the same

successful results as those obtained by a skilled veterinarian, and it is therefore advisable that the services of such a veterinarian should always be obtained in those districts where it is possible. In many cases it will be found that the injection of air into the udder will be sufficient to combat the disease without any other treatment, but it is always advisable to study the symptoms of each individual case and administer in a rational manner the indicated medicines.

VII. Prevention.

The most recent preventive treatment suggested is in line with the favorable results obtained by the injection of air into the udder. It consists in allowing the susceptible cow to retain in the udder for 24 hours after calving all the milk except the small quantity required by the calf, which should be taken if possible from each quarter. The distention of the udder naturally follows as in the air treatment and acts as a preventive against milk fever. In the Island of Jersey and at the Biltmore Farms, N. C., where this practice is common, the number of milk fever cases has been greatly lessened. General sanitary conditions should also be looked after, such as the supply of pure air and clean stabling, with plenty of clear cool water and laxative foods, such as grasses and roots. Some observers who believe in the microbic origin of the disease have recommended the cleaning of the manure and dirt from the animal and spraying the hind quarters and genitals with a 4 to 5 per cent solution of carbolic acid, lysol, or creolin, just prior to calving. From our present knowledge of the disease, however, this is probably unnecessary.

CHAPTER XI.

DISEASES OF THE NERVOUS SYSTEM.

- I. PHRENITIS, OR INFLAMMATION OF THE BRAIN.—II. APOPLEXY.—III. EPILEPSY.—IV. PARALYSIS.—V. TETANUS.—VI. RABIES OR HYDROPHOBIA.—VII. NERVOUS DEBILITY AT PARTURITION.

I. Phrenitis, or Inflammation of the Brain.

This distressing disease, which is most common during the summer months, may be either idiopathic (primary disease) or symptomatic. It may result from fever, or from inflammation in some other part, its immediate cause being too great a flow of blood which presses on the temporal arteries, and causes increased action in all the circulatory vessels.

How to know it.—There will be strong pulsation in the temporal arteries, constant watchfulness, and finally raving. The eyes are inflamed; the animal will fall suddenly, soon rising again, however; there will be trembling and starting of the tendons; the skin will be harsh and the urine suppressed. In a more unfavorable stage, there will also be grinding of the teeth, and total want of rest. Really idiopathic phrenitis is rare. It is generally caused by acute indigestion, impaction of the omentum, and other local troubles.

What to do.—The treatment consists of a good cathartic, as, for instance, No. 8, the effect of which should be assisted by injections of warm water and soap.

Bleed from the jugular vein; keep the head cool by means of ice or very cold water; and if the limbs are cold, use mustard or strong embrocations of ammonia. Aconite is also considered beneficial, but it should never be used except under the direction of a veterinarian. During recovery, the animal should be kept quiet, and have good nourishing and easily digested food.

II. Apoplexy.

In true apoplexy, the animal drops suddenly, and death ensues very soon, unless immediate relief is given. The means to be used are bleeding from the jugular vein, and the administration of a purgative, such as No. 8, with injections of soap and water. Give a change of food.

III. Epilepsy

Epilepsy is rare, except in the case of young animals. There will be severe convulsions, followed by stupor, with foaming at the mouth. The

heart beats are strong and violent. The visible membranes are heightened in color, and either dangerous lethargy supervenes, or the animal quickly recovers. Recovery is seldom so perfect, however, that the animal will not be subject to other attacks.

What to do.—Dash cold water over the head and face, and when the attack subsides, give good food and special care, with such remedial measures as may be indicated by the general state of the system, as, for example, indigestion or constipation.

IV. Paralysis.

In those rare cases where paralysis exists as a distinct affection, death usually occurs very soon. Its most common forms are those known as *paraplegia* and *hemiplegia*. The former is when the whole fore or hind parts are affected; the latter, when one side of the body only is so. Paralysis is a loss of voluntary movement, and usually occurs as a symptom of other diseases, as softening of the brain, effusions of fluid thereon, etc.

What to do.—Give recipe No. 8, supplementing it with the following:

No. 54.	2 Drachms nux vomica,
	½ Ounce saltpetre,
	Mix.

Give as one dose; repeat morning and night for a month.

V. Tetanus or Lockjaw.

Tetanus is a general and continued spasm (or, more strictly, contraction) of the muscles of the body, both voluntary and involuntary. When the muscles of the jaw are principally affected it is called *trismus*, or in popular language, lockjaw, the term tetanus being more properly limited to the general form.

Causes.—This is now known to be an infectious disease due to the introduction through a wound of a microbe called the *bacillus tetani*. This germ works best in a small wound, in which the air is excluded by closure of the wound by swelling, or crusting over with a scab. Under these conditions the germs grow, increase in numbers, and produce chemical poisons called *ptomaines* that are absorbed into the blood and poison the nervous system, producing cramps of the muscular tissues of the body. The germs exist naturally in the soil, especially in rich garden soil, consequently, tetanus occurs most often through wounds in the feet, especially nail pricks. The wounds may be so small as to preclude detection on account of the hair covering the body and legs, or they may be in the alimentary tract from punctures by sharp particles in the food, but for tetanus to develop there must be a wound and the bacilli must gain entrance through it. It

may follow castration. The case may be mild or severe; the mild one will recover by the system outliving the poison, and the severe one will prove fatal by the muscular cramps interfering with circulation of the blood and respiration

How to know it.—The disease is insidious in its operations, until the dangerous stage comes on. The animal may be dull, off its feed, and generally disinclined to move. Then the whole body may become affected, with the hind legs wide apart, the nose protruding, head and tail elevated, breathing quickened, and the pulse frequent and corded. The bowels are strongly bound. Sometimes the back is depressed downward, and sometimes arched up; and sometimes the spasm throws the head to one side. There are different technical names for the several manifestations.

What to do.—Little can be done, except to remove all irritating objects, give calming medicines, and operate on the bowels as soon as possible. The nervous excitement will be lessened by keeping the patient in a dark place. Search for the wound, clip off the hair, enlarge the wound by slitting it up with a knife, then wash it with warm water and soap, and bathe and inject it with recipe No. 9; bind on a pack of oakum wet with this lotion. Dress it two or three times a day. Give plenty of linseed gruel to drink.

VI. Rabies or Hydrophobia.

It seems needless to repeat the general statements respecting this disease given in Part II of this work, pages 452 and 453. It is, of course, incurable, and from its exceedingly dangerous nature, the suspected animal should be immediately confined, and killed as soon as ever the symptoms become pronounced.

VII. Nervous Debility at Parturition.

This disease must not be mistaken for parturient apoplexy or peritonitis. It is readily distinguished from these by the total absence of any tendency to either high fever or lethargy. It is not confined to animals in high condition, but is found quite as often among those that are lean.

How to know it.—The pulse may be somewhat fast, but will be compressible and often weak. The udder remains soft, and the milk is plentiful and easily drawn; and though there may be constipation, the appetite will be good.

What to do.—Keep the animal warm and in good quarters, with plenty of bedding. Evacuate the bowels by warm injections, at the same time giving a mild purgative No. 8. Give stimulants, sloppy but nutritious food, hay tea, etc., and remove the milk frequently from the udder.

CHAPTER XII.

DISEASES OF THE SKIN.

I. SIMPLE ECZEMA.—II. CHRONIC ECZEMA, OR PSORIASIS.—III. ERYSIPELAS.

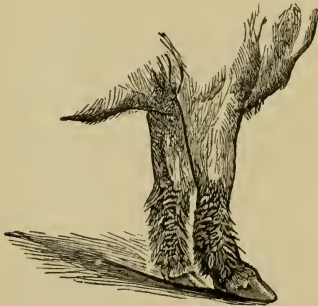
I. Simple Eczema.

This is a skin disease in which crops of vesicles come up, burst, run a little watery matter, dry up and heal, but while these are healing another crop breaks out in another place. It is attended with intense itching, which worries the animal exceedingly.

What to do.—Give a purgative, No. 8, repeating it after a week ; also, a change of food and good care. Let the cattle have salt at least twice a week. Bathe the affected parts frequently with lotion No. 47.

II. Chronic Eczema, or Psoriasis.

When simple eczema is neglected the disease becomes chronic. The skin thickens, gets hard, dry and sore, and cracks into fissures or furrows ; the discharge continues and becomes greasy, offensive and ichorous ; and the hair gets thin and stands straight out, or perhaps turns the wrong way, giving the parts the appearance of rat tails, by which name the disease is often known. It is very troublesome, frequently causing lameness, and always proving hard to cure.



CHRONIC ECZEMA, OR "RAT TAILS."

What to do.—Apply hot linseed meal poultices to the affected parts till all inflammation and soreness are gone ; then embrocate freely with lotion No. 9, using a cotton bandage wet in the lotion and applying it loosely. If there are any points of proud flesh, burn them down daily with lunar caustic. When all soreness is gone and the disease appears to be under entire control, apply either of the ointments Nos. 52 and 53.

III. Erysipelas.

This is a diffuse inflammation of the whole thickness of the true skin, sometimes extending to the subcellular tissue, and causing much pain and irritative fever.

How to know it.—It is indicated by an intensely red skin, there being, moreover, no disappearance of color under pressure. The parts are hard and internally red, but not severely swelled, but the cellular tissue is injected and infiltrated, often inclining to a pustular state. The disease terminates in resolution, suppuration or ulceration—sometimes even in mortification and gangrene. If the head is attacked, there is danger of a fatal termination.



THE POLISH COW.

This race is bred for the meat alone, being unfit for draft purposes and yielding but little milk. It was originally imported from southern Russia, and is regarded with distrust in Germany from the fact that it brought the disease known as "Rinderpest" into that country. But its meat is so desirable that it is much sought after, and the prejudice is dying out.

What to do.—If there is symptomatic fever and the animal is fat, depletion is necessary,—give No. 8; but if the animal's condition is the reverse of this, give No. 13. Follow this with nitre, in half ounce doses, twice a day. In connection with the above constitutional treatment, there should be local applications to the inflamed part, such as lotions of lead or zinc. A strong solution of nitrate of silver is sometimes applied, and with decided benefit, to the outer edge of the inflamed parts. A poultice of ripe cranberries is probably one of the best remedies for reducing the inflammation, if applied early. It is to be followed with glycerine in which a small quantity of ammonia has been dissolved, or with recipe No. 1.

CHAPTER XIII.

PARASITIC DISEASES OF CATTLE.

I. HOOSE OR HUSK (VERMINOUS BRONCHITIS).—II. THE GADFLY AND GRUB (OESTRUS BOVIS).—III. LICE.—IV. TAPEWORM.—V. MANGE. VI. RINGWORM.—VII. HOOK-WORM DISEASE OF CATTLE.

I. Hoose or Husk (Verminous Bronchitis.)

The symptoms of this disease are similar to those of bronchitis. The difficulty is caused by a species of *strongylus*—worms—(*filaria bronchitis*) the eggs of which are swallowed in grazing. Calves, and especially sheep, are the most likely to be affected, for the reason that they bite closer than cattle.

How to know it.—There will be a slight, husky cough, recurring at irregular intervals. The coat will soon become staring, and the breathing more and more embarrassed. The cough becomes more frequent, and in character more suffocating and mucous; worms, either singly or rolled together, will also be coughed up.

What to do.—Feed liberally with the soundest and most nutritious diet possible, including linseed or cotton cake, and roots, mixing in the food some good tonic, such as recipe No. 4. For calves, make four doses of the recipe. Burn turpentine on pine shavings in the pen with the calves, and let them breath the fumes, and give them a tablespoonful of sulphur in the food once a day for two weeks.

Prevention.—This is better than cure. The forms from which *filaria bronchitis* emanate are found in low, wet, undrained pastures. Hence, keep the stock off such pastures when the trouble is found, especially when wet with dew or rain. Do not allow animals to drink from stagnant ponds or pools, and look to the proper drainage of the pastures.

II. The Gadfly and Grub (Oestrus Bovis).

Little rounded tumors will often be found along the backs of cattle, during late winter and spring.



OX GADFLY (OESTRUS BOVIS.)

These are called warbles, and are the lairs of the larvæ of the ox gadfly (*oestrus bovis*). Each tumor contains a grub, which may be squeezed out by pressure, sometimes escaping with such force as



GRUB OF GADFLY.

to fly several feet. Sometimes it is necessary to enlarge the orifice with

the lancet, for the more easy expulsion of the grubs. The cuts show the two forms of the insect,—the perfect fly and the grub.

III. Lice.

Various species of lice infest the ox, the principal being the ox louse proper, the calf louse, (both of which are species of *Hæmatopinus*, or blood suckers), and a certain kind of bird louse, one of the tribe of



OX LOUSE.

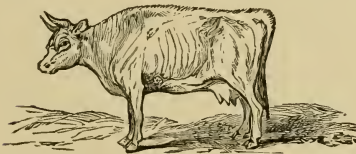


CALF LOUSE.



BIRD LOUSE.

Trichodectes, having no sucking tube, but with strong biting jaws. The cuts show all these parasites, of course very much enlarged.



APPEARANCE OF A COW AFFECTED
WITH LICE.

There are also ticks infesting cattle at certain seasons, and especially plentiful on Texas cattle. Of the several varieties found, the one known as the Texas tick (*Boophilus Bovis*) is the most important, it being the cause, at least of the transmission, of Texas fever. The

female attaches herself to the animal where the skin is thin and soft—on the insides of the thighs, along up to the anus, just back of the elbows and on the neck back of the ears—by burying her head into the skin, is fecundated by the male, which dies immediately after, and remains there till mature if not pulled or rubbed off, then she drops off and hides under a crust, where she lays her eggs and dies. The young ticks hatch out in a few days, and, being very active, get on to the cattle as opportunity offers, and so the round is continued. These ticks contain the germs of Texas fever, and they spread the disease through their bites. The accompanying cut shows the Texas tick.



TEXAS TICK.

What to do.—The remedy for ticks consists in careful currying and picking them off. This can be done if the herd is small, but to avoid overlooking the small ones, which are just as injurious as the large ones, sponge them thoroughly once a week with No. 55, or paraffin oil, till all ticks are killed. All ticks that are pulled or curried off should be burned. For lice on cattle, the following will be found among the best remedies in use:

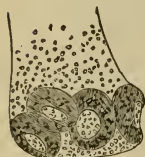
No. 55.	$\frac{1}{2}$ Pound of tobacco,
	1 Gallon of water,
	Steep for two hours.

Wash the affected animal with this infusion thoroughly, using it warm.

IV. Tapeworm.

It is not necessary here to go into a dissertation on the tapeworm. The microscopic eggs (a single worm is estimated to lay as high as 25,000,000) are passed with the exuviae of dogs, and are taken up by grazing stock.

One of the forms in which it exists in cattle is the cystic, found in the muscles. The parasite which is the mature tapeworm is found in the bowels of the human family, and in animals, especially dogs. The cut shows the head of a tapeworm of the species known as *tænia mediocanellata*.



HEAD OF TAPE-
WORM GOT BY
EATING BEEF.

Prevention.—Prevention of the parasites in the immature form in stock consists in destroying all exuviae of dogs in pastures, wherever found. Once encysted in animals, there is no remedy. For prevention of tapeworm in the human family, eat no meat, not even smoked meat, without thorough cooking.

V. Mange.

There are a number of parasitic insects which attach themselves to ill-conditioned cattle, producing itching. The latter is intensely aggravated in hot weather. A species of *dermatocoptes*, similar to the itch or scab



GAMASUS OF MUSTY FODDER.

insect, is the most prolific cause of this class of affections. There is also a microscopic insect, the *gamasus* of musty hay, which sometimes infests the skin of animals feeding thereon. The cut shows the last named insect highly magnified. Treat about the same as for mange in the horse. (See page 530).

VI. Ringworm.

This is somewhat common in cattle, showing as a greater or less number of round bald spots, covered with white scales, and surrounded with bristly or split hairs which are scabbed around the roots, with some eruption on the skin.

spots covered with white scales, and surrounded with bristly or split hairs which are scabbed around the roots, with some eruption on the skin. The microscope shows it to be a vegetable parasite. It is readily transmitted from one animal to another.

What to do.—Clip off the hair, and wash the part with soap and water, to remove all scabs; when dry, rub in well a little of the following:

- | | |
|---------|--|
| No. 56. | 2 Ounces tincture of iodine,
1 Ounce oil of tar,
2 Ounces glycerine,
Mix. |
|---------|--|

Repeat the application once a day until cured. Or, instead, the following may be used in the same way:

- | | |
|---------|---|
| No. 57. | 1 Ounce solution iodo-bromide of calcium compound,
3 Ounces water,
Mix. |
|---------|---|

Rub well in once a day.

VII. Hook-Worm Disease of Cattle.

This disease, also referred to as bovine uncinariasis and salt sickness, has been reported from Texas, Florida, and South Carolina, and is probably widely distributed throughout the Southern States. C. F. Dawson, of the Florida Station, reports it as the most common disease of cattle. Investigations by A. F. Conradi and E. Barnett, at the South Carolina Station, have shown cattle to be seriously infested with the hook worm, which is frequently associated with other intestinal parasites, including the twisted wireworm or stomach worm, the inflated bowel worm, and the hair worm. The disease as described by Doctor Dawson is "an acute or chronic parasitic disease manifested at first by low fever, diarrhea, loss of appetite, soon becoming chronic, with continuance of low fever, constipation, loss of appetite, progressive emaciation, and pronounced anemia, which, in many cases, terminates fatally."

Young animals are more susceptible than older ones, but all ages may be affected. The nematode or round worm, formerly described as *Uncinaria radiata*, is the exciting cause of the disease. These worms, found principally in the duodenum or first division of the small intestine, are provided with an armature of sharp teeth, by means of which they pierce the lining of the intestines and suck blood, moving from place to place. Other species of hook worm which affect sheep, dogs, cats, foxes, man, and other animals should not be confounded with the species that affects cattle.

How to know.—The adult worm is from one-half to five-eighths inch in length and of the thickness of an ordinary pin. The eggs are deposited in the intestinal tract and are discharged in the feces, through an examination of which the extent of infestation can be determined. Conradi and Barnett have observed a gorged female whose oviduct contained more than 1,500 eggs, 17 of which were deposited in one hour. At a temperature

ranging from 48 degrees to 60 degrees F. forty-one days are required for the eggs to hatch. The life history and habits of the worm have been studied by Conradi and Barnett.

Upon hatching, the young hook worms are very minute, but can easily be seen with the aid of a hand lens when crawling on the glass walls of the breeding jars. They have a tendency to congregate, and these clusters can be easily recognized with the unaided eye. In this stage, as well as in the egg stage, they are very susceptible to heat or cold, being easily killed. Drought is also fatal, the worms dying in a few minutes. They feed on the fecal matter about them. In the second stage they are but slightly hardier. After several days the body wall becomes thicker and more rigid, and soon they pass to the final larval stage.

The larvæ that were hatched from eggs, gathered from fresh feces on February 26, and hatched February 28, had mostly passed to the final larval stage on March 15. In this stage they are protected by a resistant covering called "sheath." Worms kept in the laboratory during January and February, the temperature varying from 48 to 60 degrees F., passed to the final larval stage in forty-one days. While active they were able to continue feeding through the aperture in the front end of the sheath. They move up and down on any near-by moist object, whether it is earth, grass, leaves, or weeds. They finally become quiescent in some elevated position, discontinue feeding, and are then greatly resistant to heat, cold, and drought. This habit of rising appears to be advantageous, as we believe, the principal method of host infestation is through the mouth.

That part of life history from egg to larval stage is very probably completed in a few days during the warm weather of summer.

The eggs and young worms require moisture. It seems quite probable that little development takes place in feces dropped on a hill during the drought of summer. There is said to be little danger from infestation in running water.

At present the outlook for a cure for this disease is not very encouraging. Thymol has given good results in the treatment of the disease in man, and has been recommended by some authorities for the disease in cattle and sheep, but we believe it is far from being a specific. Certainly, in the case above referred to, with a dose of 150 grains, it could not be noticed that the worms had been in the least affected three days later. However, further experiments with this drug will be made as opportunity presents itself. Even if drugs such as thymol were effective in expelling the worms, the animal, if still pasturing on infested land, would continue to reinfest itself, so that the problem resolves itself into a question of prevention rather than treatment, the outlook for which is more encouraging.

What to do.—When it is remembered that the disease occurs chiefly, or altogether, on low, wet lands, and that in dry seasons it is less severe, it would appear that much could be done by avoiding such places as pastures

for at least one year. The land should be thoroughly drained, and it would be well to liberally apply air-slaked lime to accelerate drying. If in hook-worm infested lots the droppings are gathered every day, it will decrease the infestation.

Plowing, undoubtedly, also reduces the dangers of infestation, as heavily infested material buried 3 inches in loose, pulverulent, moist soil in the laboratory showed that a little over one-third as many larvæ ascended on the glass wall of the breeding jar as in the jar used as a check where an equal amount of material from the same droppings was left on the surface of the moist soil.

It is recommended that on hook-worm infested farms annual crop rotation be practiced as far as possible. The manure should be removed from stables occupied by infested animals daily and air-slaked lime used liberally to dry up the floors. The greatest precaution should be exercised to prevent the spread of this parasite into localities where it does not yet occur, either by shipments of infested cattle or otherwise.

Where it is desirable to eradicate this pest from a lot previous to putting in animals that are not infested, it may be accomplished by burning.

Dipping Cattle and Hogs.

Cattle are dipped for mange (scab) which is prevalent on the large cattle ranges of this country. It is highly contagious, being due to a microscopical animal mite that burrows in the skin, causing the animal to rub furiously on any post, tree or other object that he can get to. The hair falls out, the skin becomes thickened, scabby and wrinkled over large surfaces in bad cases. They become quite thin in flesh, thus entailing great loss. On the farm the cattle can be treated successfully by the means prescribed for mange in the horse, but on the range dipping has to be resorted to. A tank four feet wide, six feet deep and twelve feet long is built, water tight. The last six feet of the tank towards the outlet is sloped upwards with cross cleats on the floor for the cattle to walk out on. A chute is built leading up to the tank, and then on a level for about twelve feet leading on to a trap that falls with the animal's weight and plunges him into the dip. A man stands on each side of the tank to help him through it and safely on to the incline leading out of it. They should go through the dipping process slowly so as to be in the dip two or three minutes. In this manner a large number can be dipped in a day. The dip may be composed of various substances, but the dip that is most commonly used is a one per cent solution of any of the coal tar emulsions. The liquid in the tank should be of sufficient quantity to completely cover the animal when he plunges into it. The dipping should be repeated after a week.

Hogs are usually dipped for lice. A tank and chute similar to the one above described, but, of course, very much smaller, is used for large herds, but for small herds a good method is to spray them with a force pump with a rose nozzle on the hose. A one per cent solution of a coal tar emulsion is the best for lice. The application should be repeated after a week. The sty and other enclosures where the hogs congregate should be cleaned and sprayed with the same solution.

CHAPTER XIV.

SCABIES OF CATTLE, OR MANGE.

I. ITS CAUSE.—II. FORM AND LIFE HISTORY OF THE SCAB PARASITE.—
III. TRANSMISSION OF MANGE.—IV. DISINFECTION.—V. TREATMENT.
—VI. GENERAL DIRECTIONS.

I. Its Cause.

This disease has prevailed to a considerable extent among the range cattle of the West and Northwest, and has been heard of in other portions of the country. We quote from government report:

Scabies, or mange, of the ox is a contagious disease caused by a parasitic mite. Cattle are chiefly affected with but two varieties of these parasites, or mites, which belong to the class Arachnoidea. These are, first, the *Psoroptes*; second, the *Symbiotes*. The first is the one which most frequently affects them. It lives on the surface of the skin and by its biting gives rise to great irritation and itching. It is most frequent upon the sides of the neck and shoulders, at the base of the horns, and at the root of the tail. From these points it spreads to the back and sides, and may invade nearly the entire body. Its principal manifestations are more or less numerous pimples, exudation, and abundant scaling off of the skin, falling out of the hair, and the formation of dry, gray-brownish scabs. In the course of time the skin becomes thickened, stiff, wrinkled, and acquires the consistence of leather. When mange has spread over a large surface of the body, the animals lose flesh and become weak and anemic, rendering them constitutionally less able to withstand or combat the effects of the mites. At the same time the decreased vigor and lessened vitality of the affected animals favor more rapid multiplication of the mites and the further extension and intensification of the disease. Thus we have cause and effect working together, with the result that scabies, or mange, of cattle may in some cases prove fatal; especially are fatal terminations likely to occur in the latter part of a severe winter among immature and growing animals, or those of adult and full age when in an unthrifty condition at the time of becoming infected. Variations in the progress of the disease have been noticed depending upon the season of the year, aggravation in winter alternating with improvement in summer.

The mite which causes cattle itch, or mange, is closely related to the mite which causes sheep scab; both belong to the same genus and species, but are different varieties. The sheep-scab mite will not attack cattle, nor

will the cattle mite attack sheep or other animals. The itch mites are found to be very numerous upon affected cattle, and a very small quantity of débris from an actively infested area of the skin will often reveal a surprisingly large number of the parasites. These mites may be removed from an animal and retain their vitality for a long time. Specimens have been collected and kept in small glass bottles in the laboratory at the ordinary temperature of the room during the winter months, varying from 45° F. during the night to 80° F. during the day, which would live and remain active from eight to eleven days. Exposure to bright sunlight, however, would kill most of the mites in a few hours.

Scabies does not appear to affect cattle while they are doing well on grass, nor to attack those in good condition over three years old. The animals which suffer most are calves, yearlings, and two-year-olds, and those in poor condition. The first symptom of the disease is usually an intense itching of the skin about the neck or shoulders, which extends more or less rapidly, depending largely upon the health and vigor of the animal, along the back and sides and down the outside of the legs, but does not usually affect the inside of the legs nor the skin of the abdomen.

The other variety of this parasite which produces mange in cattle is the *Symbiotes*. This is known as Symbiotic mange, or tail mange. It remains generally localized upon the depressions on the back part of the croup and at the base of the tail. It may, however, extend over the whole surface of the body if the treatment of the disease and care of the affected animal are neglected. These cases, however, are rare. Foot mange is also exceptional in cattle. Tail mange has almost no spreading tendency, and its contagiousness is hardly noticeable. It yields readily to treatment, and any remedy that will destroy the activity of the parasite producing the Psoroptic, or common form of mange, will readily kill that causing the Symbiotic, or tail mange. It is possible for the different morbid conditions produced by these two varieties of parasites to exist in the same animal at the same time.

II. Form and Life History of the Scab Parasite.

The *Psoroptes*, the first variety referred to, live upon the surface of the skin, adhere to it, and suck the blood and lymph of the skin by means of their mouth organs, producing a more or less intense inflammation through the numerous stings which they inflict. This species is characterized by its relatively greater size. Its general form is rounded or egg-shaped. It can be seen with the naked eye upon dark surfaces, and is very easily seen with the help of a magnifying glass. The head is elongated and pointed. The jaws are long, straight, and stinging. The legs are very long. The sucking cups, which are tulip or trumpet-shaped, are

carried on the legs. In the male they are seen on the four pairs of legs; in the female, upon the first, second, and fourth pairs only. In their immature form the *Psoroptes* or common mange mites have three pairs of legs, while in the adult state they possess four. The latter with five joints are fitted with suction cups covered with fine hair and armed with claws or hooks. The head, thorax, and abdomen are not separated. The mouth parts are represented by mandibles or jaws. The skin surface is covered with scales, hair, spikes, or silky hair, etc.

Females, which are larger than males, lay from 20 to 24 eggs; at the end of 4 to 7 days the larvæ come out and, after having undergone 3 or 4 changes, arrive at the stage of reproduction from the fourteenth to the seventeenth day. If exposed to damp air, or placed upon wet manure, the mange mites continue to live from 6 to 8 weeks. Upon damp ground the eggs remain alive from 2 to 4 weeks. In a dry place they lose their vitality after 4 to 6 days. Moderate heat is favorable to their vitality and to the hatching of the mites.

In warm places under cover, and during the summer, their movements are more active and they multiply more rapidly than under the opposite condition. It has been estimated that one female alone may produce 1,500,000 individuals in 90 days.

Each animal species has its specific mange parasites, or mites; consequently the expression "mange" must necessarily be incomplete unless the variety of the parasite is indicated. Thus, of the *Psoroptic* variety, we have the ox mange mites, the horse mange mites, and the sheep mange mites.

In each of these animals we also have the *Symbiotic*, or tail mange, and in each the variety would be designated as in the case of the *Psoroptic* or common form; but in neither variety is the contagion transmitted from one species of animal to the other. The tail-mange mites live especially upon the surface of the skin of the extremities, and exist in scabs in the outer layer of the skin. Their outlines are visible to the naked eye. The head is short and wider than it is long. The body is slightly egg-shaped and notched upon the outer edge. The legs are long and the sucking cups are shaped like a Roman shield, and are distributed in both the male and female, as in the case of the same organs on the legs of the common mange mites.

Sarcoptic mange is a more serious disease than either of those already described, but is not common to cattle. It would not, therefore, seem important to refer to this form of mange parasite and occupy space in this bulletin except by a reference to the serious disease which is produced by this variety of mite through certain characteristics natural to it. We find *Sarcoptic* mange in the following domesticated animals: Horse, sheep, goat, dog, cat and pig.

This variety dig galleries under the outer layer of the skin and live on the cells of the middle layer of the skin. They multiply in these galleries and occasion a very intense inflammation of the skin. Because of the depth to which the *Sarcoptes* burrow Sarcoptic mange is exceedingly hard to eradicate. It would, therefore, seem fortunate that this form of the disease is not common to cattle. It is rebellious to all medication, and very frequently recurrences of the disease are seen after treatment which has been prolonged for months.

III. Transmissibility of Mange.

Concerning the transmissibility of the different manges to animals and man, we find that all *Sarcoptes* may live for a considerable period upon man's skin, but the common mange mites, the first variety described, and the tail-mange mites, the second variety described, die very rapidly and occasion but slight irritations. The horse may contract Sarcoptic mange of the sheep, pig, dog, and cat. The ox takes the *Sarcoptes* of the horse, sheep, goat, and cat. The sheep contracts Sarcoptic mange of the goat. The dog takes the *Sarcoptes* of man, pig, cat, sheep, and goat. The pig contracts Sarcoptic mange of the goat. From this it will be seen: the Sarcoptic mange, unlike the common and tail manges, is transmissible from one species of animal to another.

IV. Disinfection.

What has already been said with regard to the contagious character of scabies in cattle—of the number of scab mites which may be found in a small quantity of the debris of the skin and their ability to live and remain active for a considerable length of time under unfavorable conditions—will indicate the importance of the thorough disinfection of corrals, sheds, or other buildings in which affected cattle may have been kept. It is therefore necessary, in order to attain success in the treatment of this disease, to destroy parasites which have fallen off or have been dislodged from the animals, as well as those that are upon them; otherwise there is danger of their becoming reinfected from the premises after the effects of the remedy applied to the animals have disappeared.

V. Treatment.

Methods in operation for the treatment of scabies in sheep have become more or less familiar to all people interested in sheep husbandry, and it may be said that the same treatment so successfully applied in ridding sheep of scabies has been found equally efficacious in the treatment of scabies of cattle.

During the past few years many thousands of cattle have been successfully treated for mange in different States of the Middle West and Middle

Northwest under the observation and supervision of inspectors of this Bureau; Dr. A. D. Melvin, Assistant Chief of the Bureau, and Dr. Robert H. Treacy, Inspector, having submitted plans and specifications, which will be found further on.

The dip previously used contained an excess of lime, and frequently proved quite irritating to the eyes and tender parts of the skin; hence the lime-and-sulphur dip now adopted and recommended for the treatment of scabies of cattle is made with the following ingredients:

Flowers of sulphur.....	pounds..	24
Unslaked lime.....	do....	12
Water	gallons..	100

Place the unslaked lime in a mortar box or some suitable vessel and add enough water to slake it and form a lime paste or lime putty. Sift into this lime paste the flowers of sulphur and stir the mixture well. Be sure to weigh both the lime and the sulphur, and do not trust to measure them in a bucket or guess at the weight. Place the sulphur and lime paste in a kettle or boiler with about 25 or 30 gallons of boiling water, and boil the mixture for two hours at least, stirring the liquid and sediment. The boiling should be continued until the sulphur disappears, or almost disappears, from the surface. The solution is then of a chocolate or liver color. The longer the solution boils the more the sulphur is dissolved, and the less caustic the ooze becomes. Some writers advise boiling from thirty to forty minutes, but this is not sufficient; a good ooze can be obtained only by boiling from two to three hours, adding water when necessary. Pour the mixture and sediment into a large tub or barrel, placed near the dipping vat and provided with a bung-hole about 4 inches from the bottom, and allow it ample time (from two to three hours or more if necessary) to settle.

The use of some kind of a settling tank provided with a bung-hole is an absolute necessity, unless the boiler is so arranged that it may be used for both boiling and settling. An ordinary kerosene oil barrel will answer very well as a small settling tank. To insert a spigot about 3 to 4 inches from the bottom is an easy matter. Draining off the liquid through a spigot has a great advantage over dipping it out because less commotion occurs in the liquid, which therefore remains freer from sediment. When fully settled, draw off the clear liquid into the dipping vat and add enough warm water to make 100 gallons. But under no circumstances should the sediment in the barrel be used for dipping purposes. A double precaution against allowing the sediment to enter the vat is to strain the liquid through ordinary bagging as it is drawn from the barrel or settling tank.

The above directions are for the quantity of dip given in the preceding formula. Any multiple of the constituents may be used, depending upon

the capacity of the boiler, vessels, and tank to be filled, but let it be repeated that there should be no guessing about the proportions; that the directions for the preparation of the dip as here given should be closely followed, care being taken that boiling be continued for the full time recommended.

Another good method for making this dip, highly recommended by experienced inspectors, is to mix the lime and sulphur in a mortar box, then slake the lime thoroughly and put the mixture in the cooking tank (which should contain one-fifth the total quantity of water required for the dip), after the water in the cooking tank is nearly boiling. If the mortar box is not at hand the lime and sulphur may be mixed and slaked in the cooking vat and the water then added for cooking. The mixture must be boiled for at least two hours, stirring often. Then add enough water to replace that which has boiled away, so as to have the original proportion of water. Allow to settle two hours, or longer if possible, and draw off the clear liquid for use in dipping.

The liquid obtained by these processes contains calcium sulphides in solution and now only requires the addition of sufficient clear water to reduce to the proper strength for dipping. Flowers of sulphur must be used and the lime must be of good quality.

VI. General Directions.

Soft water is better than hard water for dipping, but if it can not be obtained the hard water may be softened by adding potash or lye, but no more should be added than sufficient to cut the water.

The average depth of the liquid used in a dipping vat is from $5\frac{1}{2}$ to 6 feet, and the amount of dip necessary to obtain that depth should be ascertained before preparing the dip, in order that the requisite amount of the liquid may be prepared.

In 1 gallon there are 231 cubic inches. In order to find the number of gallons contained in a dipping vat multiply together, in inches, the average length, the average breadth, and the depth, and divide by 231, and the result will be the number of gallons. To obtain the average length of vat, add the length at the bottom to the length at the top of dip—or water line—and divide by 2; obtain the average width in the same manner. The depth should be taken at the center of vat, and should be from the bottom to water or dip line.

Be sure to measure only the space filled by the dip, and not above that line. The cooking vat should also be measured. It is convenient to have rods marked, showing the number of gallons at various depths.

Mix the dip thoroughly in the dipping vat by stirring lengthwise in the vat, also from top to bottom. A large hoe is a good instrument to use in stirring. After the dip is thoroughly mixed, take the temperature at different parts of the vat; see that it is uniform, and, if too hot or too cold,

add hot or cold water with proper proportion of dip until the right temperature is obtained; be careful to have all well mixed. The temperature of the dip when used should be from 102° to 110° F.

To ascertain the temperature, take some of the dip out of the vat in a bucket, hold the thermometer in it, and read the temperature while it is in the fluid. The dip must be changed as soon as it becomes filthy, regardless of the number of cattle dipped in it, and in no case should it be used when more than ten days old. When there is any doubt as to the good quality and proper strength of the dip, or if it seems to have deteriorated by standing, by freezing, or by being fouled by use, do not depend upon it, but throw it away, clean out the dipping vat, and make new dip. In emptying the vat the entire contents must be removed, including all sediment and droppings and other foreign matter.

In order to attain success in the treatment of mange, care and thoroughness of method must be observed. Animals that have been exposed should be dipped as well as those that show distinct evidences of the disease. After the lapse of ten days or two weeks following the first dipping, the animals should be subjected to a second dipping, in order that parasites which may have survived the first treatment, or which may have gotten on the animals from corrals, sheds, buildings, or elsewhere, may be destroyed. Careful examinations of thousands of cattle, thirty to forty days after being put through the dip for the second time, have failed to reveal evidence of scabies on any of them.

The dip liquid in the tanks during the whole dipping process should be kept at the temperature before stated—from 102° to 110° F. Each animal should be kept two minutes in the dip, and be put completely under twice during that time. All bad cases should be hand-rubbed and kept in the dip four minutes.

Pregnant cows have been treated, as well as cattle of all ages, from calves to full-grown steers, with the loss of but one animal in one of the swimming tanks. This was a steer which for some unknown reason seemed to be unable to swim and was drowned. It would appear that the dipping of cows, when proper care is taken—especially to prevent crowding in the chutes—has no appreciable effect upon abortions, as a comparison with previous years showed that the dipping had not increased the average number of abortions regularly occurring among these herds before dips were used.

CHAPTER XV

DISEASES OF THE EYE.

I. OPHTHALMIA OR CONJUNCTIVITIS.—II. FUNGUS HÆMATODES, OR BLEEDING CANCER.—III. TORN EYELIDS.—IV. INVERSION AND EVERSION OF THE EYELIDS.—V. FOREIGN SUBSTANCES IN THE EYE.

I. Ophthalmia or Conjunctivitis.

As a rule, cattle are subject to but few diseases of the eye, the most common being simple soreness or inflammation of the conjunctiva (lining of the lids), from the introduction of foreign bodies, exposure to cold winds, scratching of thorns, or blows from horns of other cattle, or else from kicks or some similar violence on the part of the attendants.

How to know it.—There is swelling and congestion of the lids; weeping, the tears running down over the cheek; shaking and hanging of the head; refusal of food; suspension of rumination, etc. On examination, it will be found that the eye is kept closed or nearly so, and is very red; and the small blood-vessels of the eye-ball are enlarged and injected. The inflammation may extend to the internal parts of the eye, and pus may gather and fall to the bottom of the anterior chamber, forming a whitish yellow spot. Cataract may result from this, or, at least, opacity from the formation of a white film over the surface of the eyeball (cornea).

What to do.—Give a mild purgative, No. 8. Bathe the eye with warm milk and water, half and half, several times a day, and apply the following lotion with a camel's hair brush directly to the eyeball and all other parts, several times a day.

No 58.	2 Grains sulphate of atropia,
	1 Ounce water,
	Mix.

After the active inflammation is subdued, apply the following lotion in addition to the other treatment, which should still be continued:

No. 59.	10 Grains nitrate of silver,
	1 Ounce water,
	Mix.

Apply directly to the eyeball, morning and night, with a camel's hair brush. Continue this till all opacity is gone, that is, till the white half-moon spot at the bottom of the anterior chamber is absorbed

II. Fungus Hæmatodes, or Bleeding Cancer.

This is a cancerous growth that may develop on any part of the body but is especially apt to come in the eye, destroying that organ, and forming a large, spongy, fungus-like excrescence that bleeds upon the slightest injury, in fact almost upon a mere touch.

What to do.—When the exact nature of the disease is recognized, the eye should be dissected out, and the animal fitted for the butcher as speedily as possible. The operation is the same as that described under “Extirpation of the Eye” in the Horse department.



FUNGUS HÆMATODES.

III. Torn Eyelids.

As in everything of the nature of a “blemish,” an injury to the eye is of less consequence in cattle than in the horse. Still, both humanity and self-interest dictate that it should not be neglected. In a case of torn eyelids,—an accident that may happen in various ways,—bring the edges neatly together, and sew them with fine silk. Dress them afterwards with a weak carbolic or other healing lotion, applying the same two or three times a day as long as necessary.

IV. Inversion and Eversion of the Eyelids.

These are more of an annoyance than a serious ailment, and are not of very frequent occurrence in cattle. Their technical names are *entropium* and *ectropium*, respectively, under which they have been described in the Horse department, on page 524, to which the reader is referred. They are identical with what oculists are often called on to treat in the human subject.

V. Foreign Substances in the Eye.

Hayseed, hair, or other foreign particles in the eye always occasion great annoyance, and often real suffering, which the animal will manifest by keeping the eye partly closed, and perhaps by turning the head slightly awry. Anything of this kind should be removed at once, the head being well secured, so that the operator will run no risk of injury from the horns. The method of procedure, as also the subsequent treatment, will be similar to that described on page 520 for the horse.

Pink eye in cattle:—This disease resembles epizootic catarrh in that the eyes become red and tears stream down the cheeks. Those affected usually become blind by a film growing over the ball. If an abscess form, mix powdered calomel and starch in equal parts and blow into the eye. Otherwise, dissolve 20 gr. of boracic acid in an oz. of water and apply to the eye once or twice per day. Isolate the animal affected and put in a dark stable in the day time.

CHAPTER XVI.

ACCIDENTS, ETC.

I. CHOKING.—II. FRACTURES.—III. WOUNDS.—IV. DISLOCATIONS.—V. SPRAINS.—VI. WENS.—VII. BLOAT IN CATTLE.

In this chapter we shall treat of the more common accidents, such as every stock-man is called on to face more or less frequently every year. They often require immediate attention, and even if a veterinary surgeon is within reach it will in many cases be very desirable to take a half dozen stitches or so, while waiting for him.

I. Choking.

This is a common accident where roots are fed, and it may happen on any farm in the fall, if the cattle have access to apples, etc. The imperfectly chewed turnip or apple sticks in the gullet, (which in cattle is small), and resists all the animal's efforts to dislodge it.

How to know it.—There is always tympanitis; the head is extended and neck stretched out; saliva drools from the mouth; the animal manifests restlessness and pain; she keeps chewing and making frequent efforts to swallow; and an anxious expression is seen on the countenance. Death may follow, either from suffocation or from rupture of the diaphragm.

What to do.—Ascertain if the object is in the throat or neck, and if it is, place a balling iron in the mouth, (or a plow clevis may be used, provided it will open the mouth wide enough to allow the hand to be inserted); have the head steadied, and insert your hand and take it out. An assistant to manipulate the obstruction on the outside, and push it up against you, will facilitate its removal wonderfully. If it cannot be reached, tap the paunch with the trochar and cannula, to evacuate the gas; (see cuts on pages 861 and 862); then pass down the probang, and with steady, gentle force push it through into the stomach. In the absence of a probang, a strong, three-quarter inch rope may be used. Dip it in hot water and oil it; then pass it down, twisting occasionally with the twist of the rope. Even, gentle pressure on the probang will make the obstruction yield in a few minutes.

II. Fractures.

As a rule, a broken bone is more easily repaired in the case of cattle than in horses, owing to their being more quiet. Fractures are classified

as transverse, oblique, "green-stick," simple, compound, comminuted and complex. In transverse fracture, the bone is broken square off; in oblique, it is broken obliquely across; in "green-stick," it is bent and split, but not broken clear off. In simple fractures, only the bone is broken without any complications; in compound, the ends of the broken bones punch through the flesh, and protrude; in comminuted, the bone is shattered into many small pieces; in complex, the bone is not only broken, but there is serious damage also done to important soft tissues, such as lacerations of blood vessels, nerves, ligaments and other tissues of joints.

How to know it.—The only reliable tests, when there is displacement, is the unnatural position of the parts and the crepitation (grating of one bone upon another) that may be heard when the parts are moved.

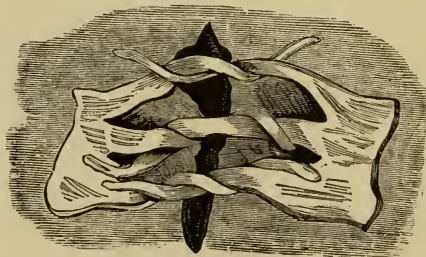


TRANSVERSE AND OBLIQUE FRACTURES OF BONE.

What to do.—In case of a broken leg (by far the most common fracture in cattle), place the bones in position as nearly as possible, and put on a plaster of Paris bandage, to enclose the leg and maintain the parts in place. In the absence of plaster of Paris, sole leather, softened with water and fitted to the leg may be used; bind it on with a bandage. Keep the animal as quiet as possible. Compound and complex fractures are generally fatal, on account of the inflammation that follows.

III. Wounds.

Wounds on the body may be sewed up with any of the different sutures described in the Horse department, on page 556. Wounds on the



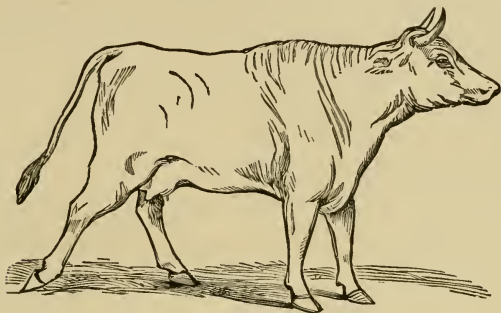
MANY-TAILED BANDAGE FOR LARGE LACERATED AND OPEN WOUNDS.

legs are best held together with bandages. The many-tailed bandage is particularly handy to draw the edges together and hold them in place

Bandages should be kept scrupulously clean, by washing them once or twice a day and bathing them with recipe No. 9. When the wound is well filled up, apply No. 1, with No. 2 occasionally.

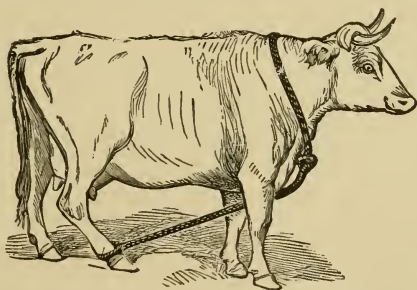
IV. Dislocations.

Cattle are peculiarly liable to dislocation of the patella. It slips off on the outside when the leg is back of a perpendicular position, and the animal is unable to bring it forward. This is well shown in the accompany-



DISLOCATION OF THE PATELLA

ing illustration. It is best reduced by pulling the foot forward with a rope passed around the pastern, and pushing inwards on the stifle bone (patella), when it will snap in, and locomotion can be resumed at once.



SIMPLE METHOD OF PREVENTING A RECURRENCE OF DISLOCATION OF THE PATELLA.

In the first few instances, the joint is injured, so that considerable swelling takes place and causes great lameness, but after a few dislocations it slips in and out easily.

What to do.—Fasten the leg forward with the rope passed around the neck as seen in the annexed cut. Foment the joint with hot water

several times a day, and when the inflammation is gone, blister thoroughly with the following blister :

No. 60.	1 Ounce powdered cantharides,
	4 Ounces lard,
	Mix.

Rub well in.

V. Sprains.

The best treatment for sprains is to foment them with hot water or hot vinegar three times a day, and apply the following liniment, rubbing it in thoroughly :

No. 61.	2 Ounces tincture arnica,
	i Ounce alcohol,
	1 Ounce turpentine,
	1 Ounce laudanum,
	1 Ounce liquor ammonia,
	Water to make one pint.
	Mix.

If practicable, bandage tolerably tight. Give rest till the lameness is all gone.

VI. Wens.

These are hard, fibrous tumors resulting, usually, from a blow or other external violence. They are frequently seen on the ribs, legs and jaws of oxen.

What to do.—If noticed when first started, when they are sore, foment them with hot water several times a day; after a few days, the soreness being partially gone, paint them with tincture of iodine once a day. If, however, they become large and hard, nothing will be of any use short of dissecting them out. This may be done without any danger. Afterwards dress the wound with recipe No. 9, two or three times a day.

VII. Bloat in Cattle.

Internal treatment for Bloat in Cattle:—Cattle bloat when turned into luxurious, succulent feed, when not accustomed to it, or are fed too many roots, apples or potatoes at a time, especially if not accustomed to them. They also bloat when choked. If it is severe, with great distress in breathing, they must be tapped with a trocar and canula. After tapping, or in cases not requiring it, give a purgative of Epsom Salts one pound, ginger one ounce, oil of turpentine two ounces, warm water to make two quarts, mix and give as one dose.

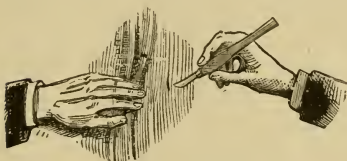
CHAPTER XVII.

OPERATIONS.

I. TAPPING THE CHEST, AND TAPPING THE BELLY.—II. TRACHEOTOMY.—III. TAPPING THE RUMEN (PAUNCH) FOR HOVEN.—IV. RUMENOTOMY.—V. CASTRATION.—VI. SPAYING.—VII. TAPPING THE BLADDER OF THE OX OR BULL.—VIII. SUTURES AND BANDAGES.—IX. CÆSARIAN OPERATION.—X. BLEEDING.

I. Tapping the Chest, and Tapping the Belly.

The first of these operations (*paracentesis thoracis*) has for its object the removal of water from the chest in hydrothorax. Clip off the hair



MAKING THE INCISION WITH THE KNIFE

from a spot about three inches back of the joint of the elbow, and on a level with it. Make an incision through the skin and muscles to a depth of about two inches, being careful to locate it so that it shall pass between two ribs, and not too close to the posterior aspect of the

anterior one of the two—about midway if possible. Then pass in the trochar and cannula, withdraw the trochar, and leave the cannula to act as a spout for the water. If lymph or other substance clogs the hole,



THE FLUID FLOWING FROM THE CHEST THROUGH THE CANNULA.

push it away with a whalebone probe. The other side may be tapped in the same way. The trochar for this operation should be about a quarter of an inch in diameter.

Paracentesis Abdomenis is the same operation, to empty the belly in peritonitis. Make the incision in the center line of the belly just back of the navel. Use the same trochar, but do not insert it deeper than two inches. In either of these operations, when the instrument is withdrawn the hole will close without any aid.

II. Tracheotomy.

This is the insertion of a tube in the windpipe, in case of threatened suffocation. It is identical with the same operation on the horse, described on page 558.

III. Tapping the Rumen (Paunch) for Hoven.

Insert the trochar, which may be a large one ($\frac{3}{8}$ of an inch in diameter), in the center of a triangle made by the last rib, the anterior point of the hip and the ends of the transverse processes of the lumbar spines on the left side. Point it downward and inward obliquely, and it will pass directly into the paunch, which grows to the left side only, and only in this vicinity. Pull out the trochar, and the gas will escape through the cannula. (See the article, with cuts, on Hoven.)

IV. Rumenotomy.

This is an operation to empty the paunch in case of engorgement, when a passage cannot be effected in the regular way. Clip off the hair from the triangle described in the last article, on the left side. (see cuts on pages 862 and 863); and make an opening, running up and down, large enough to insert the hand; open first the skin, next the muscles, then the wall of the paunch. Insert a towel, and arrange it to cover the lower edge of the wound, to keep the latter clean. Then empty the paunch with the hand. When nearly empty, pour in recipe No. 26, wash the wound, and sew it up with cat-gut sutures. First sew the paunch, leaving the ends hanging inside; then draw the muscles together, the ends of the ligatures hanging outside; then sew up the skin. Dress the whole with lotion No. 9, keeping the parts wet with it nearly all the time.

V. Castration.

This may be done to calves by laying them down on their backs, opening the scrotum and cutting through the tunics to the testicle, letting it out, when the tunics may be cut from their attachment at the end of the testicle, and the testicle pulled out, tearing away the spermatic cord. Pour a little cold water into the scrotum, and let the calf up. Old bulls may be castrated standing. Make a separate opening for each testicle, and let the testicle out of the tunics; cut off the cord with the ecraseur well up towards the body; if no ecraseur is procurable, apply clamps, which may be removed after two days.

VI. Spaying.

This is an operation on the female to remove the ovaries, and corresponds to castration of the male. In young, small heifers it is best done in the flank. Lay the heifer on her left side with the legs stretched back. Clip off the hair from the angle between the point of the hip and last rib; make an incision, running up and down, large enough to admit the hand; pass the hand into the abdominal cavity and find the womb; follow up a horn of the womb till the ovary is reached, pull the ovary out, and either cut or twist it off,—preferably the latter, to avoid bleeding. If cut off, the artery should be twisted, to arrest the hemorrhage. The parts are put back, and the other ovary is brought up and operated on similarly. This one may be more difficult to bring out, but gentle traction will accomplish it. Select warm pleasant weather for this operation, to avoid chilling the intestines. Great care should be taken to keep everything as clean as possible, as hair or other foreign particles, introduced into the belly, might cause fatal peritonitis. Stitch up the walls of the belly first; then the skin with cat-gut, interrupted sutures. Dress the wound with lotion No. 9.

Cows are best operated on standing. Make the incision through the upper wall of the vagina close to the *os uteri*, large enough to introduce two fingers, by which the ovaries are pulled out and excised with an *ecraseur*. No stitches are needed in this wound. Dress it afterwards with lotion No. 47, twice a day. Feed lightly for a day or two before the operation, and give bran mashes for a few days after. If peritonitis sets in, (which, however, it is not very likely to do), treat it according to the directions for that disease.

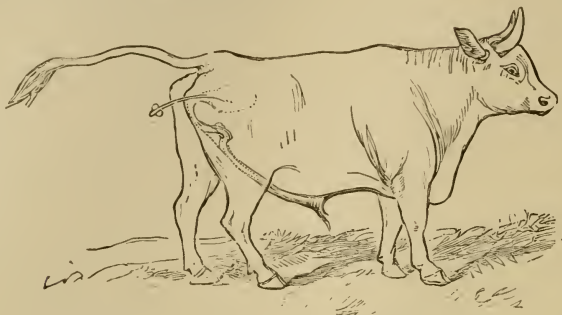
VII. Tapping the Bladder of the Ox or Bull.

When it is necessary to draw off the urine of the male, an opening must be made at the point where the penis turns over the angle of the pelvis, and the catheter introduced as seen in the annexed cut. The incision should be made very carefully, and no larger than really necessary to introduce the instrument. Dress the wound with No. 9, twice a day. It will be advisable to take a stitch in it, of course. The curve in the urethral canal (see cut on page 872) is what makes this operation necessary, as it renders the introduction of a catheter by the penis impossible.

VIII. Sutures and Bandages.

Sutures are used in sewing wounds, whenever they are longer than half an inch. The material generally used is silk, doubled once or twice, to make the cord large enough to prevent it from pulling out. Silver wire

may be used, but has no special advantages over the silk. Pass the needle through the skin about half an inch back from the edge and tie loosely, leaving the ends about half an inch long.



OPERATION FOR REMOVING URINE FROM THE OX.

Bandages are particularly useful in cases of wounds on the legs, since there the stitches will almost invariably pull out, unless thus reinforced. The many-tailed bandage shown on page 924 is very useful. For further details see the corresponding article in the Horse department.

IX. The Cæsarian Operation.

This is resorted to for the delivery of the calf, in the extremity mentioned on page 887. The belly is opened high up in the flank on the right side, and an incision made in the uterus, and the calf taken out. It is seldom resorted to, for obvious reasons.

X. Bleeding.

A cord is passed around the neck, and tied tight enough to raise the vein, over which a fleam is held and struck with the blood-stick. When sufficient blood has been taken, remove the cord and close the wound with a twisted ("figure 8") suture.

The article on Bleeding, in the Horse department, should be read in connection with the foregoing directions.



OX PREPARED FOR BLEEDING.

Dehorning cattle:—The best way to do this is to breed them off. To get rid of the horns from those passed beyond the "button" stage use a saw or a pair of clippers. Under this age, moisten a small piece of caustic potash and apply gently over the coming horn until the skin slips from the tip and the job is done.

Bloody Milk:—Mix a pound of epsom salts and a teaspoonful of saltpeter in a quart of warm water and give as a drench. Give a teaspoonful of saltpeter in a bran mash every night, bathe the bag with warm water and rub in lard and camphor.

CHAPTER XVIII.

RECIPES FOR CATTLE.

As a matter of convenience to the reader, to whom time will often be precious in treating his sick stock, we add this chapter, recapitulating all our prescriptions for cattle.

NO. 1. HEALING LOTION.

Sugar of lead, 1 ounce,
Carbolic acid, 2 drachms,
Laudanum, 1 ounce,
Water to make 1 pint,
Mix.
Apply three times a day.

NO. 2. ANTISEPTIC LOTION.

Carbolic acid, 1 part,
Olive oil, 8 parts,
Mix.
Apply three times a day

NO. 3. ANTISEPTIC DRENCH.

Nitro-muriatic acid, 1 drachm,
Bi-chromate potash, 3 grains,
Chlorate potash, 2 drachms,
Water, $\frac{1}{2}$ pint,
Mix.
Give as one dose two or three times a day.

NO. 4. TONIC POWDER.

Copperas, $\frac{1}{2}$ ounce,
Oil-cake, a handful,
Powder and mix.
Give as one dose, and repeat morning and night.

NO. 5. POWDER FOR RHEUMATISM.

Colchicum, 2 drachms,
Nitrate of potash, 2 drachms,
Mix.
Give as one dose, and repeat night and morning for a week.

NO. 6. LINIMENT FOR RHEUMATISM.

Laudanum, 1 ounce,
Spirits camphor, 1 ounce,
Turpentine, 1 ounce,
Water to make 1 pint,
Mix.
Apply three times a day with friction, and bandage.

NO. 7. TONIC DRENCH.

Gentian root, 1 ounce,
Ginger, $\frac{1}{2}$ ounce,
Oatmeal gruel, 1 quart,
Mix.
Give as one dose, and repeat three times a day for two weeks.

NO. 8. MILD PURGATIVE.

Epsom salts, 12 ounces,
Ginger, 1 ounce,
Gentian, 1 ounce,
Syrup, 4 ounces,
Water to make 2 quarts,
Mix.
Give as one dose.

NO. 9. CARBOLIC LOTION.

Carbolic acid, $\frac{1}{2}$ ounce,
Water, 1 pint,
Mix.
Apply two or three times a day; in case of a surface sore, bind on a sponge wet with the lotion.

- No. 10. ALTERNATIVE AND STIMULATING DRENCH.**
 Iodide potash, 2 drachms,
 Whiskey, 2 ounces,
 Powdered cinchona, 1 ounce,
 Gruel, 1 pint,
 Mix.
 Give as one dose, and repeat three times a day.
-
- No. 11. TONIC POWDER.**
 Saccharized carbonate of iron, 2 drs.
 Powdered cinchona bark, 2 drs.,
 Mix.
 Give as one dose; repeat morning and night.
-
- No. 12. TURPENTINE DRENCH.**
 Oil turpentine, 1 ounce,
 Linseed oil, $\frac{1}{2}$ pint,
 Mix.
 Give as one dose, repeat three times a day.
-
- No. 13. TONIC DRENCH.**
 Tincture muriate of iron, $\frac{1}{2}$ ounce,
 Tincture cinchona, 1 ounce,
 Water, 2 ounces,
 Mix.
 Give as one dose; repeat three times a day, between the doses of No. 12.
-
- No. 14. AMMONIA LINIMENT.**
 Liquor of ammonia, 1 ounce,
 Oil of turpentine, 1 ounce,
 Linseed oil, 1 ounce,
 Mix.
 Rub well in to the face and head once a day.
-
- No. 15. SILVER LOTION.**
 Nitrate of silver, 10 grains,
 Water, 1 ounce,
 Mix.
 Apply twice a day with a camel's hair brush.
-
- No. 16. A GARGLE.**
 Chlorate of potash, 1 ounce,
 Water, 1 pint,
 Mix.
 Inject a little into the throat as a gargle several times a day.
-
- No. 17. MIXTURE FOR DIARRHŒA.**
 Infusion of quassia, 1 pint,
 Laudanum, 1 ounce,
 Sulphuric ether, $\frac{1}{2}$ ounce,
 Cold, thin gruel, 1 pint,
 Mix.
 Give as one dose. Repeat, if necessary.
-
- No. 18. FEVER MIXTURE.**
 Spirits nitre, 3 ounces,
 Tincture aconite root, 2 drachms,
 Fluid extract belladonna, $\frac{1}{2}$ oz.,
 Nitrate potash, 2 ounces,
 Muriate of ammonia, 2 ounces,
 Water to make 1 quart,
 Mix.
 Give half a teacupful every two or three hours till better.
-
- No. 19. TONIC AND ALTERNATIVE POWDER.**
 Nitrate of potash, 2 drachms,
 Gentian root (powdered), 2 drs.,
 Ginger, 1 drachm,
 Mix.
 Give as one dose; repeat morning and night for a week.
-
- No. 20. STIMULATING DRENCH.**
 Infusion of gentian, $\frac{1}{2}$ pint,
 Ginger, 1 drachm,
 Carbonate of ammonia, 1 drachm,
 Syrup, 2 ounces,
 Water, $\frac{1}{2}$ pint,
 Mix.
 Give as one dose, and repeat three times a day.
-
- No. 21. TONIC POWDER.**
 Sulphate of iron (copperas), 3 drs.,
 Gentian, 2 drachms,
 Ginger, 1 drachm,
 Fœnugreek seed, 1 drachm,
 Powder and mix.
 Give as one dose, and repeat morning and night for a week or two.

NO. 22. A GARGLE.

Chlorate of potash, 2 ounces,
Water, 1 quart,
Mix.

Shoot back into the throat, as a gargle, several times a day with a syringe.

NO. 23. FEVER MIXTURE.

Mindererus' spirit (acetate of ammonia), 2 ounces,
Tincture aconite root, 20 drops,
Water, $\frac{1}{2}$ pint,
Mix.

Give as one dose, and repeat every two hours till better.

NO. 24. COUGH MIXTURE.

Gum camphor, 2 drachms,
Saltpetre, 4 drachms,
Spirits of nitre, 1 ounce,
Water (or gruel), 1 pint,
Mix as directed below.

Dissolve the camphor in the nitre, and add the water (or gruel) and saltpetre, and give as one dose. Repeat every four or six hours.

NO. 25. HEALING LOTION.

Vinegar, 1 ounce,
Honey, 2 ounces,
Water, $\frac{1}{2}$ pint,
Mix.

Apply three or four times a day.

NO. 26. POWERFUL PURGATIVE.

Epsom salts, $1\frac{1}{2}$ pounds,
Ginger, 2 ounces,
Gentian, 2 ounces,
Calomel, 2 drachms,
Croton oil, 20 drops,
Syrup, 1 pint.
Warm water, 2 quarts,
Mix.

Give as one dose.

NO. 27. STIMULATING DRENCH.

Liquor ammonia, 1 ounce,
Warm ale, 1 quart,
Essence of ginger, $\frac{1}{2}$ ounce,
Mix.

Give as one dose.

NO. 28. ANTACID POWDER.

Bi-carbonate of soda, 3 drachms
Gentian, 2 drachms,
Ginger, 2 drachms,
Mix.

Give as one dose, and repeat morning and night.

NO. 29. ASTRINGENT DRENCH.

Prepared chalk, 1 ounce,
Powdered catechu, $\frac{1}{2}$ ounce
Powdered ginger, 2 drachms,
Powdered opium, $\frac{1}{2}$ drachm,
Peppermint water, $\frac{1}{2}$ pin,
Mix.

Give from two to four tablespoonfuls, according to the size of the calf, morning and night.

NO. 30. ASTRINGENT DRENCH.

Tincture of catechu, 2 ounces,
Tincture of cardamoms, 2 ounces,
Carbonate of soda, 2 drachms,
Mix.

Divide into two to four doses, according to age of animal, and give one of them morning and night.

NO. 31. ASTRINGENT DRENCH.

Powdered opium, $\frac{1}{2}$ drachm,
Tincture of cardamoms, 1 ounce,
Sulphuric ether, 3 drachms,
Linseed tea (or starch gruel) 1 pint,
Mix.

Divide into six doses; give one night and morning.

NO. 32. ALTERATIVE DRENCH.

Tincture of rhubarb, 4 ounces,
Powdered ginger, 2 drachms,
Warm gruel, 4 ounces,
Mix.

Give as one dose, and follow it with some doses of No. 30 or 31.

NO. 33. ASTRINGENT DRENCH.

Prepared chalk, $1\frac{1}{2}$ ounces,
Powdered catechu, 2 drachms,
Powdered opium, $\frac{1}{2}$ drachm,
Powdered gentian, 2 drachms,
Starch gruel, 1 pint,
Mix.

Give as one dose; repeat in twenty four hours, if necessary.

NO. 34. ASTRINGENT DRENCH.

Powdered opium, 2 drachms,
Powdered starch, 4 ounces,
Sulphuric ether, 1 ounce.
Cold ale, 1 pint,
Mix.

Give as one dose. By substituting tepid water for the ale, it may be advantageously used as an injection.

NO. 35. ASTRINGENT DRENCH.

Tannic acid, $\frac{1}{2}$ drachm,
Powdered opium, 1 drachm,
Powdered gentian, 1 ounce,
Warm ale, 1 pint,
Mix.

Give as one dose.

NO. 36. ALTERNATIVE DRENCH.

Calomel, 1 drachm,
Powdered opium, 2 drachms,
Gruel, 1 quart,
Mix.

Give as one dose.

NO. 37. ALTERNATIVE DRENCH.

Epsom salts, 7 ounces,
Powdered opium, 2 drachms,
Powdered gentian, 2 drachms,
Gruel, 1 pint,
Mix.

Give as one dose.

NO. 38. ANTISEPTIC MIXTURE.

Chloride of lime, $\frac{1}{2}$ ounce,
Tincture of arnica, $\frac{1}{2}$ ounce,
Sulphuric ether, 1 ounce,
Starch gruel, 2 quarts,
Mix.

Give half by the mouth and half by injection.

NO. 39. STRONG INJECTION.

Linseed oil, 1 pint,
Oil turpentine, 4 ounces,
Croton oil, 30 drops,
Warm water, 1 quart,
Soft soap, 1 ounce,
Mix.

Repeat three times a day as an injection, till a full purgative action is got.

NO. 40. STIMULATING SUBCUTANEOUS INJECTION.

Strychnine, 4 grains,
Spirits of wine, 1 ounce,
Sulphuric acid, 6 drops,
Mix.

When dissolved, inject from ten to twenty drops under the skin.

NO. 41. ANODYNE FEVER MIXTURE.

Camphor, 2 drachms,
Sulphuric ether, $\frac{1}{2}$ ounce,
Acetate of ammonia, 4 ounces, (as directed below),
Mix.

Dissolve the camphor in the sulphuric ether, and then add the acetate of ammonia. Give as one dose in ale or gruel.

NO. 42. FEVER MIXTURE.

Mindererus' spirit, 3 ounces,
Tincture aconite root, 20 drops,
Linseed tea, 1 pint,
Mix.

Give as one dose, and repeat every two hours till better.

NO. 43. STIMULATING DRENCH.

Sulphuric acid, 2 drachms,
Tincture of eardamoms, 1 ounce
Water, 1 pint,
Mix.

Give as one dose.

NO. 44. ANTILITHIC INJECTION.

Hydrochloric acid, 1 drachm,
Water, $\frac{1}{2}$ pint,
Mix.

Inject into the bladder.

NO. 45. ACID DRENCH.

Hydrochloric acid, 20 drops,
Gentian, 3 drachms,
Oat meal gruel, 1 pint,
Mix.

Give as one dose, and repeat it morning and night for a few days

NO. 46. ANTACID POWDER.

Bi-carbonate soda, $\frac{1}{2}$ pound,
Gentian, 4 ounces,
Linseed meal, 2 pounds,
Mix.

Give two tablespoonfuls morning
and night for two or three weeks.

NO. 47. ANTISEPTIC INJECTION.

Carbolic acid, $\frac{1}{2}$ ounce,
Water, $\frac{1}{2}$ gallon,
Mix.

Use as injection twice a day.

NO. 48. ANODYNE DRENCH.

Chloral hydrate, 1 ounce,
Water, 1 pint,
Mix.

Give as one dose; repeat, if neces-
sary, in half an hour.

NO. 49. HEALING LOTION.

Spirits of camphor, 4 ounces,
Sugar of lead, 1 ounce,
Sulphate of zinc, 2 drachms,
Soft water, 1 quart,
Mix.

Bathe the parts once a day.

NO. 50. SOFTENING LOTION.

Gum camphor, 4 ounces,
Olive oil, 1 pint,
Mix.

Rub well in three times a day.

NO. 51. ANTISEPTIC POWDER.

Sulphite soda, 1 ounce,
Nitrate potash, 2 drachms,
Mix.

Give as one dose in a bran mash;
repeat morning and night for a
week.

NO. 52. ASTRINGENT OINTMENT.

Alum, 1 ounce,
Carbolic acid, 1 drachm,
Lard, 4 ounces,
Powder the alum and mix.
Apply twice a day.

NO. 53. ASTRINGENT OINTMENT.

Tannic acid, $\frac{1}{2}$ ounce,
Carbolic acid, 1 drachm,
Lard, 4 ounces,
Mix.

Apply twice a day.

NO. 54. NERVINE AND ALTERATIVE.

Nux vomica, 2 drachms,
Saltpetre, $\frac{1}{2}$ ounce,
Mix.

Give as one dose, repeating it morn-
ing and night for a month.

NO. 55. LOTION FOR LICE.

Tobacco, $\frac{1}{2}$ Pound,
Water, 1 gallon,
Steep for two hours.
Apply warm.

NO. 56. MIXTURE FOR RINGWORM.

Tincture of iodine, 2 ounces,
Oil of tar, 1 ounce,
Glycerine, 2 ounces,
Mix.

Rub well in once a day.

NO. 57. MIXTURE FOR RINGWORM.

Solution iodo-bromide of calcium
compound, 1 ounce,
Water, 3 ounces,
Mix.

Rub well in once a day.

NO. 58. EYE WASH.

Sulphate of atropia, 2 grains,
Water, 1 ounce,
Mix.

Apply several times a day with a
camel's hair brush.

NO. 59. EYE WASH.

Nitrate of silver, 10 grains,
Water, 1 ounce,
Mix.

Apply directly to the eyeball, morn-
ing and night, with a camel's
hair brush.

No. 60. FLY BLISTER.

Powdered cantharides, 1 ounce,
Lard, 4 ounces,
Mix.
Rub well in.

Turpentine, 1 ounce,
Laudanum, 1 ounce,
Liquor ammonia, 1 ounce,
Water to make one pint,
Mix.

No. 61. LINIMENT FOR SPRAINS.

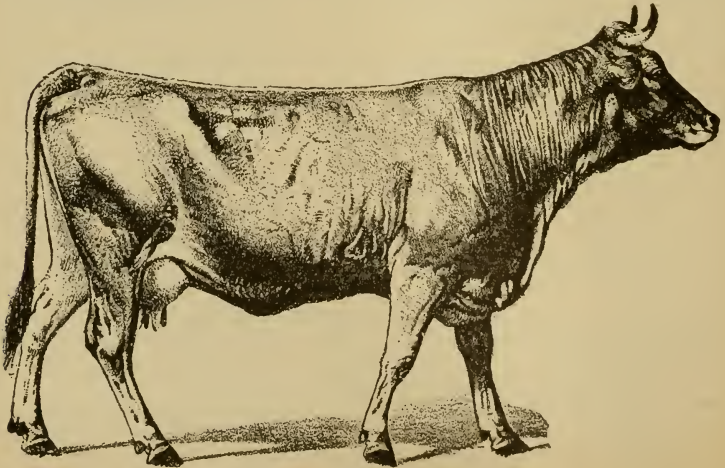
Tincture arnica, 2 ounces,
Alcohol, 1 ounce,

If practicable, bandage tolerably tight. Give rest till the lameness is all gone.



A DUTCH COW.

This cow belongs by nature to lowlands of a moist and marshy character where there is much green vegetation. They are not beautiful, but produce large quantities of milk, and are greatly esteemed for their excellent beef.



THE LIMBURGER COW OF GERMANY.

This race is found in the Belgian province of Limbourg, and a part of Wurtemberg. The color is silvery-yellow, with now and then a white spot in the forehead. They are small, but very fine milkers.



GROUP YORKSHIRES
Pure Bred and Noted Prize Winners.—Specially photographed for this work.

BOOK III

PART I

SWINE

HISTORY, MANAGEMENT AND CHARACTERISTICS
OF THE VARIOUS BREEDS



CHESTER WHITES.
Premium Winners at the International Live Stock Show.

SWINE.

CHAPTER I.

HISTORY AND STATISTICS OF SWINE.

I. ORIGIN AND ANTIQUITY OF THE HOG.—II. THE NATIVE AMERICAN SPECIES
—III. SWINE OF EUROPE, ASIA AND AFRICA.—IV. THE WILD HOGS OF
EUROPE.—V. TEETH OF THE HOG.—VI. BROUGHT TO AMERICA BY COLUM-
BUS.—VII. LOCATION OF PRINCIPAL MARKETS.

I. Origin and Antiquity of the Hog.

The original country of the hog, like that of the other domesticated animals of the farm, is lost in the obscurity of the past. Yet, ever since history began, the hog has been known in a wild state in Asia, Africa and in Europe. That the hogs of all these countries have a common origin is shown by the fact that they all belong to the same scientific classification, *sus scrofa*, and also by the more important fact that they are all fertile together, and continue to produce fertile offspring, from generation to generation.

The great antiquity of swine is shown by the fact that fossil remains have been found in the tertiary and diluvial deposits of Europe; and fossils of a species closely allied to them have been found in as ancient deposits in India. Whatever their origin may have been, their aptitude for taking care of themselves in a wild state—for they are both flesh and vegetable feeders—and their great fecundity would soon have enabled them to overrun large territories.

II. The Native American Species.

While the original of the domesticated hog was only found in Asia, Africa and Europe, yet allied native species are found in America. In Australia, the Polynesian groups, and the other Pacific islands, swine were unknown until introduced there by civilized people. The same is true of America. The allied species here are not, we believe, continuously fertile with the domesticated hog.

III. Swine of Europe, Asia and Africa.

While it is a fact, as previously stated, that the swine of Europe, Asia and Africa have a common origin, there is no means of knowing how or when they were first introduced. The probability, however, is that they spread spontaneously over these countries; for the original forest covering rendered the means of migration easy to them, since thick timber and all the lands along streams furnish their natural feeding grounds.

IV. The Wild Hogs of Europe.

It matters little, practically, how any of the farm animals originated, or how they were naturally disseminated over the earth; though to savants, of course, the question is curious and interesting. It is worthy of remark, that of all domestic animals used as food by man, the hog is the only one that has preserved his native characteristics unmodified in a wild state.



GROUP OF CHESTER WHITES.

The hunting of wild hogs has formed an exciting chase in all ages of the world, both on account of their fleetness and their savage courage when brought to bay. In the southern portions of the United States, in sparsely settled districts, swine are found escaped from domestication, and showing all their natural savage traits, including dangerous fierceness when brought to bay. Forty years ago the writer hunted wild hogs,—the descendants of Indian breeds,—in the swamps and morasses of northern Indiana and the timbered river bottoms of the Calumet. The hard winter of 1844, however, destroyed the last remnant of these wild hogs, they having all died in their lairs, from exposure and want of food. Wild hogs are now rarely found in Europe, and this when preserved in royal forests as in Denmark, Italy and Greece. In France and Germany they have become extremely rare, and in Great Britain the wild species has long been extinct.



YORKSHIRE BOAR.
Prize Winner at Many Expositions.—Specially photographed for this work.

V. Teeth of the Hog.

The teeth of swine are 44 in number, as follows: Incisors, six upper and six lower, (12); canines or tusks, two upper and two lower, (4); molars, or grinding teeth, fourteen upper and fourteen lower, (28); making 44, including what were formerly called wolf teeth, but are now classed with the molars. They are represented scientifically by the dental formula: $\frac{6}{6} - \frac{2}{2} - \frac{14}{14} - 44$. Furstenburg, a careful German authority, gives the manner of determining the age of swine as follows:

Born with eight teeth, four corner incisors and four tusks, on the eighth or tenth day the second or third temporary molars appear. The four nippers, two on the upper and two on the under jaw, appear at four weeks old.

At the fifth or sixth week the first temporary molars appear in the upper and lower jaw.

At the age of three months the intermediary incisors appear.

At the sixth, the so-called wolf teeth are seen, and also the third permanent molars.

At the ninth month the permanent corner incisors, the permanent tusks, and the second permanent molars will be seen.

At twelve months the permanent nippers will have appeared, and by the thirteenth month, the three temporary molars will have been shed, and the permanent ones will be seen; at fifteen months these will be fully up.

At the age of eighteen months the permanent intermediary incisors and the permanent rear molars will show, and at the twenty-first month these will be fully developed, thus completely finishing the permanent dentition.

From this time on, the means for determining the age is by the wear of the permanent teeth, and also by the increasing length of the tusks, which at from four to ten years, attain such size and become such formidable weapons that it is said that hogs have been known to cope successfully with the lion. Certain it is that no beast dares attack them when herded together, and it is only by the strategy of man that they may be successfully hunted and killed. And so dangerous has this pastime always been considered, that a boar's head has been counted as one of the most valuable trophies of the chase.

VI. Brought to America by Columbus.

The history of the introduction of swine into America is that they were brought by Columbus to Hispaniola in 1493, and to Florida in 1538 by De Soto; they were brought to Nova Scotia and Newfoundland in 1553 by the French. and into Canada in 1608. In 1609 they were brought

into Virginia by the English adventurers, and eighteen years thereafter it is recorded that their numbers had so increased that the settlement at Jamestown had to be surrounded with palisades to keep them away.

VII. Location of Principal Markets.

The ten leading hog producing states are as follows:

Iowa, Illinois, Nebraska, Missouri, Indiana, Texas, Ohio, Kansas, Georgia, Oklahoma—in the order named.

Markets naturally are located in places that are best suited for the purpose—places where the largest number of hogs can be bought at the lowest prices, and where the means of distributing the output of the packing-houses are the best. The two factors are not of equal weight. The dressed carcass can be transported with less expense than can the live animal; therefore the principal markets are located in proximity to the country where most hogs are produced. This is in the corn belt. The following are the principal hog-raising states, with the round number of hogs produced annually: Iowa, 7,000,000; Illinois, 4,000,000; Missouri, 3,000,000; Indiana, 3,000,000; Nebraska, 3,000,000; Ohio, 3,000,000; Texas, 2,000,000; Wisconsin, 2,000,000, and Kansas, 2,000,000.

The principal hog markets in the United States, with the approximate number of hogs slaughtered annually, are as follows: Chicago, 7,000,000; Kansas City, 4,000,000; Omaha, 2,000,000; St. Joseph, 2,000,000; St. Louis, 2,000,000; Indianapolis, 1,000,000; Buffalo, 1,000,000; Sioux City, 1,000,000, and Cleveland, 500,000. New York takes about 500,000, and Boston 1,500,000, annually, but these can hardly be considered markets from the farmers' standpoint, as this supply is principally bought in other markets and shipped to these places. This takes some of the hogs shipped from the Western markets of the United States. In the above figures, only the hogs that are slaughtered are taken into consideration, not those that are shipped out alive. Chicago annually ships out one million live hogs, making the total handled at that place annually about eight million.



PRIZE WINNING POLAND CHINA HOGS.
Specially photographed for this work.



BERKSHIRE HOGS.



TAMWORTH SOWS.
Prize Winners and specially photographed for this work.

CHAPTER II.

BREEDS OF SWINE.

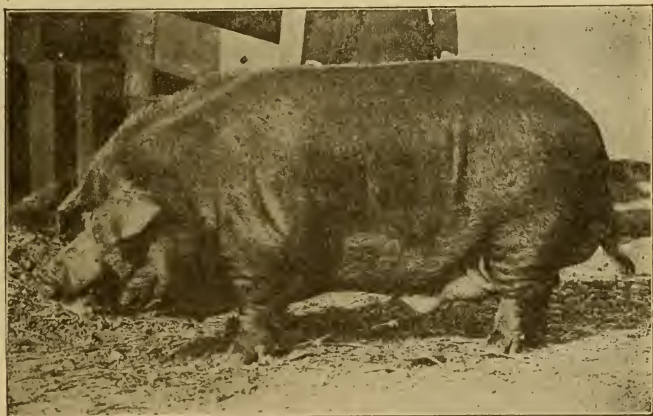
- I. Sires of Improved Breeds.—II. CHINESE SWINE.—III. NEAPOLITAN SWINE.—IV. THE HOG OF INDIA.—V. ENGLISH BREEDS—THE BERKSHIRE.—VI. THE ESSEX.—VII. THE BLACK DORSET.—VIII. THE SUFFOLK.—IX. THE YORKSHIRE.—X. LANCASHIRE BREEDS.—XI. AMERICAN BREEDS.—XII. THE CHESTER WHITE.—XIII. THE POLAND-CHINA.—XIV. THE CHESHIRE.—XV. JERSEY RED SWINE.—XVI. DUROC SWINE.—XVII. THIN RIND, OR HAMPSHIRE HOG.—XVIII. SUMMARY OF BREEDS.

I. Sires of Improved Breeds.

The swine used in the improvement of the breeds of England and the United States, are: First, the China hog; second, the Neapolitan hog, and third, the hog of India. The first has given remarkable aptitude in fattening, while the second and third have imparted style, beauty of form and excellence of flesh.

II. Chinese Swine.

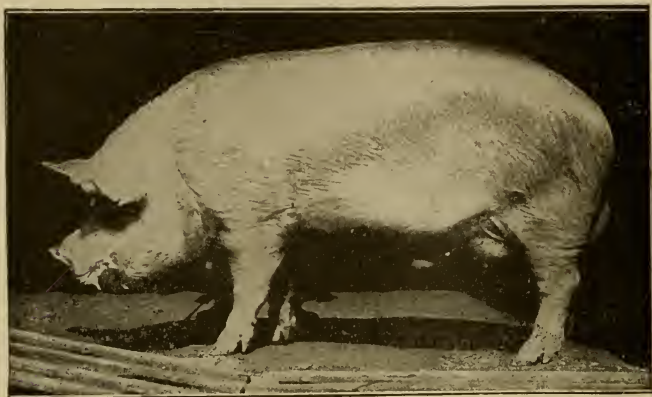
The first improvement in modern swine is undoubtedly due to importations of hogs from China. They are remarkable for prepotency of blood,



DUROC—JERSEY BOAR.

due to their careful breeding for centuries in China with special reference to early maturity and aptitude for fattening; and these hogs were the basis upon which all English and American breeds were originally

built. The infusion of this Chinese blood long since converted the original raw-boned, hard-feeding, long-nosed and long-legged hogs of England of 100 years ago, into compact, deep-bodied, broad-backed, short-nosed and early maturing hogs of fifty years ago, known in the earlier crosses



YORKSHIRE BOAR.

as Grass-breed, Irish Graziers, etc. Then came in the India hog, reducing the bone, hair, and coarseness of flesh still more; and afterwards the improved form of the India hog—the Neapolitan—still further refined them, giving us the splendid Berkshire, the Essex, and various other black and spotted breeds.

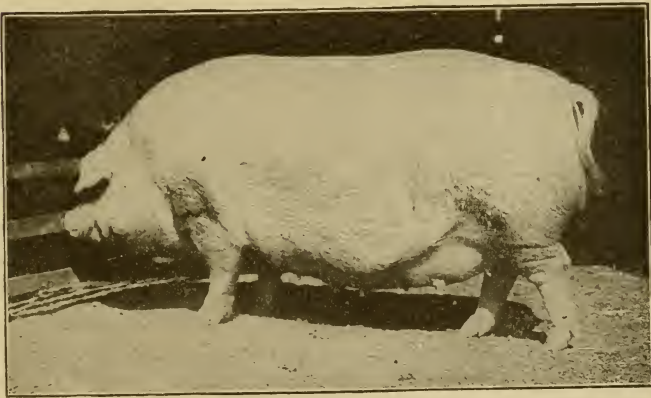
III. Neapolitan Swine.

Neapolitan swine are marked for the excellence of their flesh, their elegant style, little hair and fine bone. In relation to them Sidney says it is probable that the Neapolitans are the descendants of the dark Eastern swine imported by early Italian voyagers and cultivated to perfection by the favorable climate and welcome food. Martin is of the opinion that to this breed and to the Chinese is due the improvement of all English swine, and, in this connection mentions particularly the Berkshire, Essex, Hampshire and Yorkshire. Youatt, while accepting the authority of Martin, adds also the swine of Wiltshire. Of these breeds only the Berkshire, Essex and Yorkshire have held their ground with the other improved breeds of to-day, and these are among the finest and most generally liked of any of the now fashionable breeds. The first importation

of Neapolitan swine into the United States, is said to have been made about 1840; but in 1850 fine specimens were imported into New York by a Mr. Chamberlain. They are described as having been of a dark slate color, and as having brought their pigs true to color and characteristics.



ESSEX SOW.



CHESTER WHITE SOW.

The Neapolitans are well described by a committee of the American Swine Breeders Association as follows: Head small; forehead bony and flat; face slightly dishing; snout rather long and very slender; ears small, thin, standing forward nearly horizontally, and quite lively; jowls very full; neck short, broad and heavy above; trunk long, cylindrical and well ribbed back; back flat, and ribs arching, even in low flesh;

belly horizontal on the lower line; hind-quarters higher than the fore, but not very much so; legs very fine, the bones and joints being smaller than those of any other breed; hams and shoulders well developed and



GROUP BERKSHIRE SWINE.

meaty; tail fine, curled, flat at the extremity, and fringed with hair on each side; general color slaty, or bluish plum color, with a cast of coppery red; skin soft and fine, nearly free from hair, which, when found upon the sides of the head and behind the forelegs, is black and soft, and rather long; flesh firm and elastic to the touch.

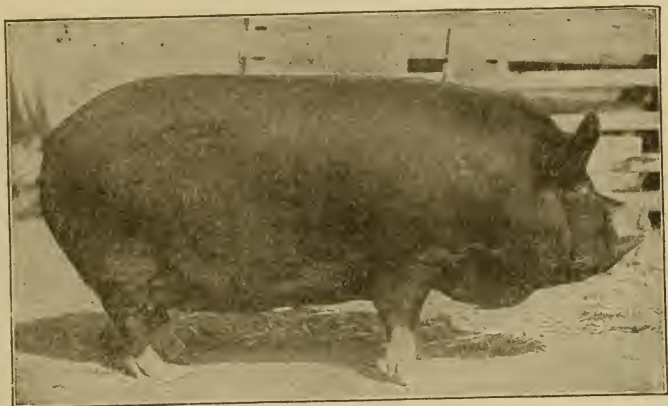
IV. The Hog of India.

These swine hold the same relation to the Neapolitan that the Chinese do to the improved breeds of white swine. They are undoubtedly ancestors of the Neapolitan breed. The hog of India, of which the Siamese hog may be said to have been a representative, was in color from a jet black to a dark slate, or rich plum color, of medium size, quick to mature; very fine in all points, with short, small legs and head; thin jowls, a dishd face, slender, erect ears; broad, deep, compact body, well ribbed, heavy hams and shoulders; slender tail, skin thin, but firm and elastic to the touch.

V. English Breeds—The Berkshire.

The Berkshire is among swine what the thoroughbred is among horses—a type of perfect breeding. The Berkshires are noted for their fine bone, great muscularity, firm flesh, and excellent hams and shoulders. Their constitutions are most excellent, and they are among the best of the improved breeds as gleaners after fattening cattle. They require somewhat more feed in proportion to their weight than some of the breeds abounding in lard and other fat; but this is compensated for in the greater proportion of lean meat and its excellent distribution.

The fashionable color now is, black all over except the dish of the face, the feet and the end of the tail, which are white. If there is white, no



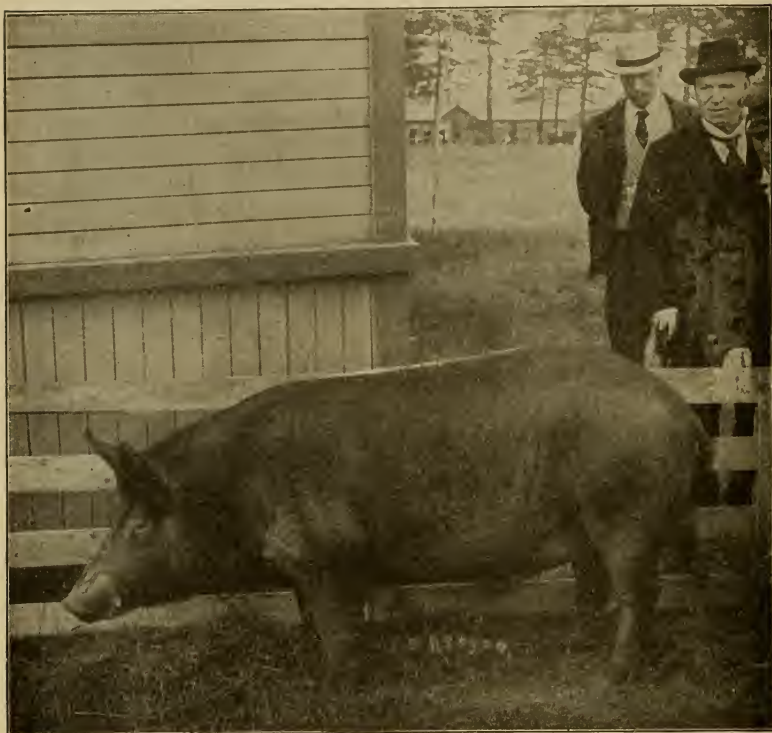
CHAMPION BERKSHIRE SOW.



POLAND CHINA SOW.

matter how small, on the body, discard such animals; a bluish spot or tinge is not objectionable, but rather shows a strengthening of the blood by reversion to the original cross. The points of the pure Berkshire

are: Face short, fine and well dished; generally broad between the eyes; ears almost erect, sometimes inclined forward with advancing age, always small, thin, soft and showing veins; jowl full; neck short and thick; shoulder short from neck, but moderately deep from back down; back broad and straight, or very little arched; ribs long and well sprung,

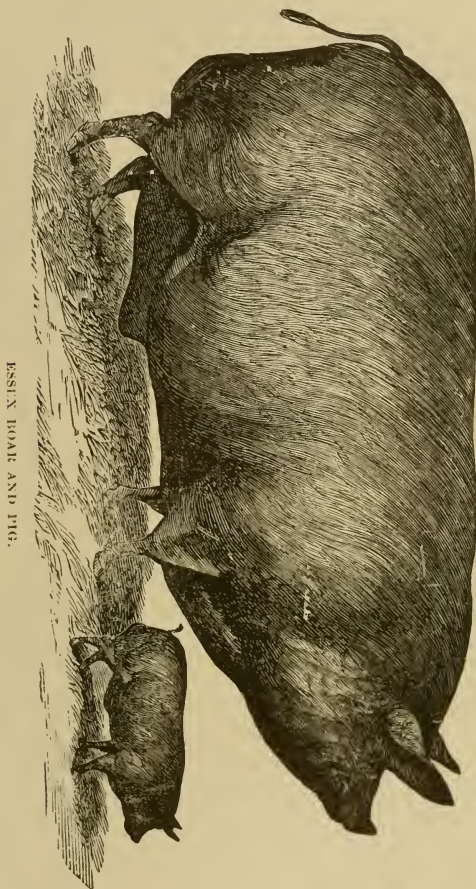


TAMWORTH BOAR.

giving rotundity of body; short ribs of good length, giving breadth and levelness of loin; hips good length from joint of hips to rump; hams thick, round and deep, holding their thickness well back and down to the hocks; tail fine and small, set on high up; legs short and fine, but straight and very strong, with hoofs erect and legs set wide apart; size medium; length medium, since extremes are to be avoided; bone fine and compact; offal very light; hair fine and soft; no bristles; skin pliable.

VI. The Essex.

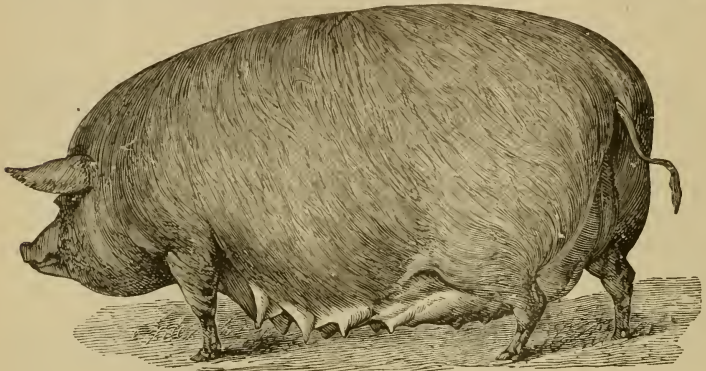
This medium to light weight English breed is, to our mind, one of the very best of the breeds ever introduced into the United States. They com-



ESSEX BOAR AND PIG.

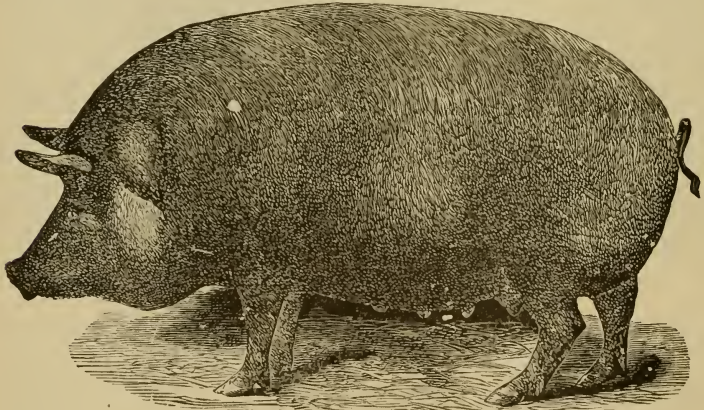
bine great stamina and vigor of constitution. They make excellent pork, not too fat. The sows are prolific and are good nurses; and the barrows fatten easily and kindly at any age. When mature they weigh about 300 pounds. They make excellent crosses on coarse swine, the produce being fine-boned, quiet, and easily fattened hogs. The Essex, in

shape and color, is not unlike the Berkshire, but larger proportionally. The color is a pure, deep black; face short and dished; ears small, soft and erect while young, but falling over somewhat with age; the bone is



ESSEX SOW.

fine, hair thin; the carcass long, broad, straight and deep, with excellent hams, carrying meat fully down near the hock. Their great delicacy of form is due to their crossing with the Neapolitan; and except that they are better haired the cuts we give would not be bad representations of the breed.



BLACK DORSET SOW.

VII. The Black Dorset.

The black swine of Dorsetshire, England, are a breed in high repute locally. They are represented as being strong-constituted, attaining,

heavy weights and fattening kindly. If the illustration, reproduced from an English cut, showing the hog in breeding flesh is a good representation of the breed, they ought to be valuable in the West. The great trouble with our breeders is that they are working their stock too fine. Many of them have not head and jaw enough to perfectly grind corn. They have too little hair, and their constitutions have suffered from too close breeding, rendering them liable to disease. We believe the coming hog will be the reverse of this.

VIII. The Suffolks.

The Suffolk is now regarded as only a variety of the Yorkshire, one of the best of the English white breeds. The Manchesters, the Middlesex, the Suffolk, the so-called Windsor, the Calchill and the Cheshire of New York State have all been formed on the Yorkshire-Cumberland stock, and the differences in all these breeds are trifling.

The characteristics of the Suffolks are given in the Swine Register as follows: Head small, very short; cheeks prominent and full; face dishd; snout small and very short; jowl fine; ears small, thin, upright, soft and silky; neck very short and thick, the head appearing almost as if set on front of shoulders; no arching of crest; crest wide and deep; elbows standing out; brisket wide, but not deep; shoulders and crop-shoulders thick, rather upright, rounding outward from top to elbows; crops wide and full. Sides and flanks—ribs well arched out from back, good length between shoulder and ham; flank well filled out and coming well down at ham. Back broad, level and straight from crest to tail, not falling off or down at tail; hams wide and full, well rounded out; twist very wide and full all the way down. Legs and feet—legs small and very short, standing wide apart, in sows just keeping the belly from the ground. Bone fine; feet small, hoofs rather spreading; tail small, long and tapering. Skin, hair, and color—skin thin, of a pinkish shade, free from color; hair fine and silky, not too thick; color of hair pale yellowish white, perfectly free from any spots or other color. Size small to medium.

The principal objections to the Suffolk are: They have too much fat; they are bad nurses; the pigs are weak; and they are subject to scrofula.

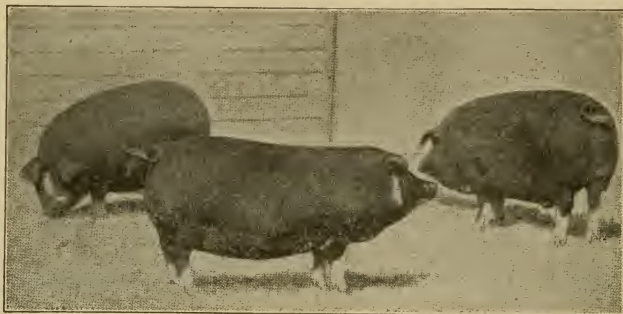
IX. The Yorkshire.

The Yorkshire is, to our mind, one of the very best of the English white breeds. They are hardy, vigorous, and well-haired; they are prolific and good nurses; they are uniform in shape and color, and of any size requisite, from 200 pound hogs up to heavy weights, according as you select the small, the middle, or the large breed. The middle breed is

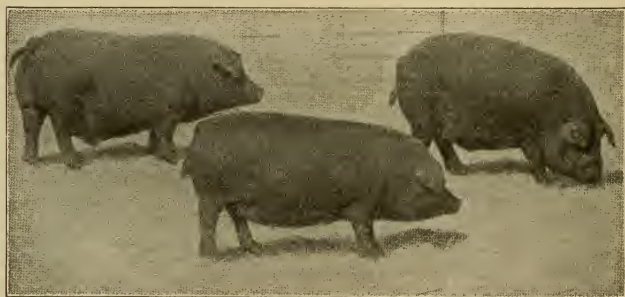
produced between the small York and the Cumberland. The large Yorkshire attains heavy weights, while the middle breed is about the size and weight of the Berkshire.

X. Lancashire Breeds.

This remarkable English breed is divided into three sub-families: The short-faced, the middle breed and the large Lancashire; the character-



GROUP POLAND-CHINA SWINE



GROUP DUROC-JERSEY SWINE

istics and color (pure white) of each being constant. Over one hundred years ago the large breed were cultivated in England, and are represented as being of immense size, large-limbed and coarse-boned.

Short Faced Lancashire.—This breed is remarkable for the shortness of the face from the eyes to the end of the snout; prick ears; small bones; a good coat of white hair; cubic in form, with broad back and

broad hams, well let down. The skin, as well as the hair, is white, although an occasional one may be found having a few dark-blue spots on the skin, but never dark or black hairs.

Lancashire Middle-Breed.—This breed is one which partakes of the quality of the small breed and the size of the large breed. Middle bred hogs are got by crossing large bred sows with small bred boars, but all attempts to attain the same results by reversing this operation, and putting large bred boars to small bred sows have proved failures. The largest of the middle bred sows are used to improve the large breed. Their characteristics are: The small bred hog must have small bones; a short face; silky hair; fine, small, upright ears; a comparatively square form; must have good square hams, the most valuable part of the hog; must carry the meat near the ground; flat on the back; straight and cubic in form.

Lancashire Large Breed.—These hogs have large bones, are of great height and length, and are the largest breed of swine known. They are a true breed, and breed constant to color and characteristics. These are: Large size, great length; flat back, with large square hams when fattened; must carry their width of back along over the hams; must have deep and tolerably straight sides, large feet and leg bones; hair short; may have a long face, but it had better be short, as they fatten better; may have a large, drooping ear, but, other qualities and size being equal, an upright, smaller ear preferred. They usually have a long, thick, strong tail; must be of great weight when fattened, and above all must be descended from a hog having the foregoing qualities, and, if a breeder, must produce them. They are short of hair, but still are hearty. A middle bred hog must have a short face, and all other good qualities of the small breed, except that they may be longer in proportion to their width; must have thicker legs and longer bones to carry the greater size; should be well haired.

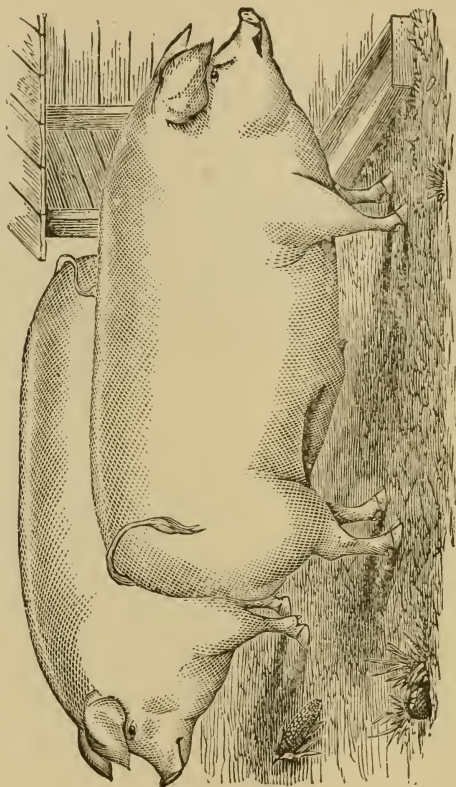
XI. American Breeds.

The American breeds in best repute are: The Chester White, which originated in Pennsylvania; the Poland-China, which originated in Ohio; Jersey Reds, originated in New Jersey; the Duroc, originated in New York; and Cheshire, originated in New York. These, however, as previously stated, are only modified Yorkshires. Of those breeds the Chester-White and Poland-China have been most widely disseminated.

XII. The Chester White.

This breed originated in Chester County, Pa., and is recorded to have been brought about as follows: The first impulse to the improvement of swine in that county was given by the introduction of a pair of fine pigs, brought from Bedfordshire, England, by Capt. James Jeffries, and

placed upon his farm near the county seat, in 1818. Some of the enterprising farmers of the neighborhood were encouraged to commence the improvement of their swine; and by crossing these pigs upon the native white hog of the county, their progeny with the best specimens attainable, and by a course of careful and judicious crossing and selection for many



CHESTER WHITE HOGS—OLD STYLE.

years, the present valuable breed of well formed, good sized, easily fattened hogs, known as Chester Whites, was produced and made an established breed.

The following are the characteristics of these hogs: Head, short and broad between the eyes; ears thin, projecting forward and lopping at the point; neck short and thick; jowl large; body lengthy and deep; back

broad ; hams full and deep ; legs short, and well set under the body for bearing the weight ; coat thin, white, and straight ; (if a little wavy it is no objection) ; small tail and no bristles.

XIII. The Poland China.

There has been much controversy over the origin and improvement of this breed of swine, and in some instances much acrimony. They have nevertheless held their own among the reputable breeds of the West. have been largely improved within the last fifteen years by infusion of Berkshire blood, and are now probably more widely disseminated west of the Alleghanies than any other breed except the Berkshires. The American Swine Breeders' Association give their history and characteristics as follows :

In 1816, the Shakers of Union Village, Warren county, O., purchased at Philadelphia one boar and three sows, of what was, at the time, believed to be pure China. They were called Big China hogs. Subsequently other China hogs were introduced and extensively used. The Shakers and other judicious breeders in Warren and Butler counties continued to cross them with the Russian and Byfield blood, that had long been in use there, and produced, by repeated crosses, a hog of exceedingly fine qualities for that period, which was generally known as the Warren county hog.

This condition of the breed continued until about the year 1835 or 1836, when the Berkshires were introduced. Other lots of Berkshires continued to come into the Miami Valley until about 1841. The Berkshire blood was liberally infused into the stock existing not only in Southwestern Ohio, but in Kentucky also.

Crossing with the Berkshires was almost exclusively done until about 1838 or 1839, when Mr. William Neff, of Cincinnati, imported some choice specimens of the Irish Grazer. This breed soon grew into high favor, and, as a consequence, was liberally used in making crosses with the best specimens of the crosses previously made. This crossing of breeds continued for some time. In a few years, however, the use of the pure blooded Berkshire was entirely discontinued, and there were no further importations made of the Irish Grazer.

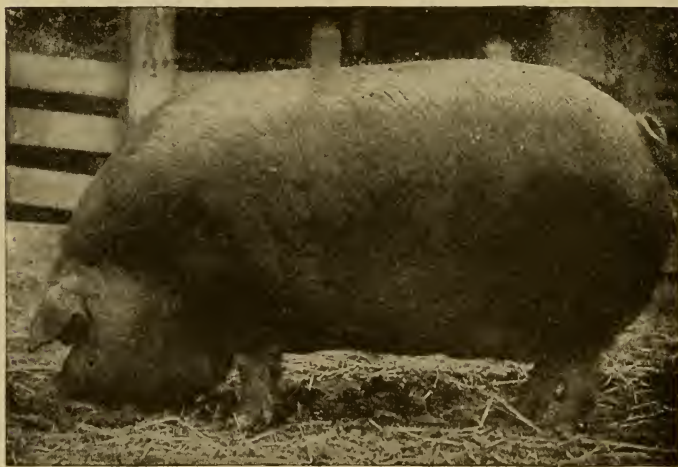
For more than thirty years no new blood has been introduced into this breed, and no effort made to obtain a new supply of the blood of either breed previously used. While this is true, the breeders have not been indifferent to the further improvement of the breed.

The best specimens have good length ; short legs ; broad, straight backs : deep sides, flanking well down on the leg ; very broad, full, square hams and shoulders ; drooping ears : short heads, wide between the eyes. of

spotted or dark color; are hardy, vigorous, and prolific, and when fat are models, combining the excellences of both large and small breeds.



HAMPSHIRE OR THIN RIND BARROWS.



DUROC JERSEY SOW.

It should be added, that the representation we give is that of a Poland-China, combining the characteristics of both the white and black crosses. The more fashionable color now is pure black, with minute white spots

scattered more or less over the body. The best strains now are pure black with white fetlocks and hoofs.

XIV. The Cheshire.

This variety, undoubtedly only a modified Yorkshire, is said to have originated in Jefferson county, N. Y. They are pure white in color, with little hair and a pink skin, thin and pliable, but not quite uniform, marked distinctions sometimes being noticed; and, like the Suffolks, the tails of the young pigs often drop off. The snout is often long, but very slender and fine. The jowls are plump, and the ear erect, fine, and thin. The



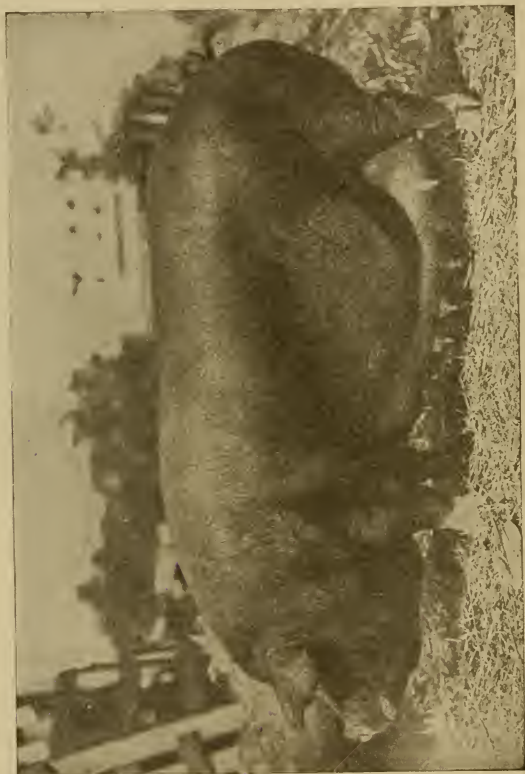
POLAND CHINA BOAR.

shoulders are wide and the hams full. The flesh of these hogs is fine-grained, and they are commended on account of the extra amount of mess-pork in proportion to the amount of offal. The probability is they will never be very popular among the breeders in the West and South. Yet, for fattening exclusively in the pen, there are few of the white breeds that excel them.

XV. Jersey Red Swine.

The origin of this breed is not positively known. In some portions of New Jersey they have been bred for over fifty years, and are there considered valuable. Their size is immense, a weight of 500 or 600 pounds being not unusual. They are also hardy, strong in constitution, and free from disease: and they are said not to be subject to mange. They

vary in color, in some neighborhoods being of a dark red, and in others quite sandy patched with white. A good specimen of a Jersey Red should be red in color with a snout of moderate length, large lop-ears, small head in proportion to the size and length of the body. They should be long in the body, standing high and rangy on their legs; bones coarse, hairy tail and brush, and hair coarse, inclining to bristle on the back.



DUROC SOW.

XVI Duroc Swine.

There is another breed of Red Swine named Durocs, which have been bred rather extensively in Saratoga county, N. Y., and have been known there for twenty-five years. They are finer in every respect than the Jersey Reds, and when mature attain great weights. They have been bred in some sections of the West with satisfaction, are more uniform in their make up, quite as good in their constitutions, and much finer in



HAMPSHIRE OR BELTED HOGS.

Noted Prize Winners.—Specially photographed for this work.

their substance than the Jersey Reds. The origin of both the Jersey Reds and the Durocs was undoubtedly in the old-fashioned Berkshire, a sandy hog with more or less black. This was not unusual with the Berkshires as we knew them and bred them over fifty years ago—a hog in every respect different from the elegant and finished swine of the last quarter of a century.

XVII. Thin Rind or Hampshire Hog.

The propriety of this name, "Thin Rind," is due to the fact that the hog has a mellow, thin skin and soft, silky hair. In this respect it differs materially from the Jersey Red, the Tamworth, and other popular breeds. The name "Hampshire" is due to the fact that the hog was a native of Hampshire, England, early in the last century. Their first importation to this country dates back to about 1825, when a sea captain living near Boston, Mass., brought some of the pigs from England to Massachusetts where they became popularly known as "Thin Rinds." By this name it has long been known in Kentucky and it has been assumed that it came from the same source as the McKay pigs imported to Massachusetts. Major Joel Garnett, a wealthy and highly intelligent farmer in Kentucky, in 1835 purchased in the East and carried to Kentucky a small herd which increased, and it became popular in that agricultural state. It is a fact that authorities differ in reference to the ancestry of this pig—some claiming that the original importation was from Tonquin, China, and that this importation was made by a noted New Orleans merchant. It is a singular fact that the early English writings make no mention of this breed.

Descriptionally, the head of the Thin Rind is of the straight faced type of medium size and with light jowl. The ears are erect but inclined slightly forward. The back is of only medium width—not thick but fairly well supported. The shoulders are light and well set in, and have fair width. The body has only moderate depth and length as a whole, but produces a fair side for bacon. The hams do not possess the thickness and depth of the more popular American breeds, as they are lacking in fullness. They are somewhat long of leg, but the bone is of good quality and the pasterns and toes are usually well placed. The color of the Thin Rind is usually black with always the white belt about the body. The width of this white band is from 4 to 12 inches wide, encircling the body just back of the fore legs and front of the hind legs.

While the list will long be retained by many of the breeders as the most fashionable color, there are also those who try to run their herds pure black. The breeding of the blacks is thought to be a necessity. Otherwise, a list of hogs would begin to show too much white, and the breeding of the blacks is to avoid narrowing the belt. The Thin Rind pig is only

about medium size and, hence, cannot be placed among the largest breeds. A weight of 500 pounds is sometimes attained by the boars, though they are usually smaller. In ordinary condition, the full-grown sow will weigh about 300 pounds. Barrows often weigh 300 to 400 pounds in high flesh. In a recent International Live Stock Exposition in Chicago, the first prize, five Thin Rinds, averaged 493 pounds each at 18 months of age, and one of these won the championship in the slaughter test.

A superior characteristic of the Thin Rind pig, is its fecundity. The sows under favorable conditions, will usually farrow litters of ten or twelve pigs, and they make excellent mothers and nurses. In this respect they rank well up with the most prolific breeds of American ancestry. The use of the pure-bred boar on good sows will result in a most prolific stock, with a decided leaning toward the bacon type. Thin Rind boars of superior quality should add vigor and killing quality to the off-spring of a certain class of high-classed sows of pronounced chunky type.

In Kentucky and elsewhere, the Thin Rind as a grazer ranks high, where pigs range more or less for mast, and seek for feed in field and forest. It is this quality, together with that of fecundity, which add to the popularity of the breed where known.

It is an admitted fact that the quality of the Thin Rind meat is distinctively superior. The breed belongs to the bacon class. When persistently fed corn for generations it, however, loses some of its bacon-producing character. Still, in the slaughter test, these pigs have made a good showing. At a recent International Live Stock Exhibit in Chicago, the second prize, for both pens of five barrows of bacon type, and for carcass, weighing 300 pounds or over, was awarded Thin Rind Barrows, exhibited by Mr. Goodwine of Illinois. Two years later, Mr. E. C. Stone won the Championship in barrow class, over all breeds.

The Thin Rind meat is of most excellent grain, and has a desirable proportion of lean to fat.

In Boon county, Kentucky, six farmers organized a farming organization to promote the Thin Rind interest, under the name of "The American Thin Rind Record Association." They have produced about twelve herds of this breed that are eligible for registration, and these are located mainly in Kentucky and Indiana. The distribution of the Thin Rind breed is not extensive. The popularity of the breed has gained perceptibly in recent years.

XVIII. Summary of Breeds.

The English breeds of to-day that have been received with the most general favor in the United States are: First, the Berkshire, next the Essex, and third the Yorkshire. The Berkshire will weigh at full maturity 500 pounds, and the Essex 400 pounds. In exceptional cases they

will average these weights. 350 pounds for Berkshire and 250 for Essex may be taken as good weights.

The Yorkshires in their three classes—small, medium and large—will weigh 250 pounds for the small, 350 pounds for the medium and up to 450 pounds for the large breed. They may, of course, be made to weigh much heavier at maturity if fully fat, and so may the other breeds mentioned. The so-called Prince Albert Suffolks are simply modified small Yorkshires, and the same may be said of the other sub-families called Suffolks. All these sub-breeds, including the Yorkshires, are pure white, and dark hair is not allowable, but bluish flesh marks or spots are not objectionable; on the contrary, they are an indication of purity of blood.

The most widely distributed of American breeds are: First, the Poland-China, and second the Chester county hogs. Well to the North the latter have been more widely disseminated than the former. In all the great corn growing region of the West, it may be safely said the Polands are the favorite of American breeds. The Jefferson county, the Jersey Reds and the Durocs, have never become widely known. We do not think the first has anything to recommend it over the small Yorkshire. They seem to have been too closely interbred, like particular families of Suffolks, a thing that should be especially guarded against in swine, since they are inclined more or less to scrofula and other cutaneous and sub-cutaneous diseases. For this reason, the Jersey Reds and Durocs, as being especially free from those taints, have been received with favor, growing year by year, and stand to-day the peer of any of the superior breeds of swine.

CHAPTER III.

THE BREEDING AND CARE OF HOGS.

- I. PRACTICAL VALUE OF IMPROVED BREEDS.—II. CARE IN SELECTION.—III. AGE OF BREEDING SWINE.—IV. HOW TO SELECT BREEDING ANIMALS.—V. FORM AND FEEDING QUALITIES.—VI. THE CARE OF BREEDING STOCK.—VII. FARROWING.—VIII. WEANING THE PIGS.—IX. CASTRATION.—X. GESTATION OF SOWS.—XI. NECESSITY OF GOOD CARE.—XII. RINGING A HOG.

I. Practical Value of Improved Breeds.

In no department of stock breeding has the value of superior breeds been more fully asserted than in the breeding of swine. Cheap food and the improvement of breeds have already made the West and Southwest the great swine-breeding and swine-feeding regions of the world, and eventually the Northwest and the South will share equally in the profits of these great industries. In all the West and Northwest, it is now difficult to find a farmer who has not swine of some one of the improved breeds. When the South, also, shall have taken hold of the business, in the extension of a diversified agriculture, millions of dollars will have been added to the wealth of that section. From what we have said in the preceding chapter, it should not be difficult for the young breeder to work understandingly and profitably. Nor can success be achieved by selecting a good breed, and starving the hogs, or allowing them to shift for themselves. Hogs of the improved breeds are not so well able to take care of themselves as those of a half-wild breed, but well cared for they will pay fifty per cent. in profit over the other breed, for the grain fed. Why? They are more quiet, and assimilate their food more perfectly. This is all there is to any superior breed of any farm stock, if we add that the flesh is better laid on in the prime parts.

II. Care in Selection.

However good the breed, if care is not taken in the selection, or coupling of animals, degeneration of the offspring will inevitably result. This is true of all animals. But care in selection is even more clearly shown to be necessary in planting grains and vegetables, for the reason that weeds, poverty of soil, and the sowing of imperfect seed, react at once on the product. Hence the reason why seedsmen make fortunes in



DUROCS.

Many Times Prize Winners.—Specially photographed for this work.

THE BREEDING AND CARE OF HOGS.

selling improved seed that have been grown on rich soil, carefully selected, and all undersized seed screened out. Exactly the same care is necessary with breeding stock. Keep this up to the mark at any cost; those animals that do not come up to the standard can be used for food. Never sell the best seeds, nor the best animals, whatever may be offered; they are worth as much to you as any one else.

III. Age of Breeding Swine.

The boar is capable of coupling at from six to eight months old, but it is better that he be at least ten months of age before being allowed to serve. The sow is capable of breeding at seven or eight months old, but



TAMWORTH SOW.

it is better that she shall not drop her first litter until she is thirteen to fifteen months old.

Two litters of pigs each year is all the sow should be allowed to raise, and the best breeders are content with one litter a year. If the sow has a warm place for farrowing, the earlier in the season the pigs are produced, the greater is the profit from them. If they come the first of March, and are well fed until the new year, there is little difficulty in making them average 250 pounds each, and such pigs should bring fully one cent a pound more than hogs wintered once and weighing perhaps fifty pounds more. The profitable plan with swine of any breed is to push their fattening from the time they are born until they are killed, for with swine, as with other farm stock, the daily increase in flesh becomes less and less as the animal increases in age.

IV. How to Select Breeding Animals.

In the selection of stock for breeding, look first to constitutional vigor. Without this, no matter what the beauty of form may be, disaster will be brought to the herd. Next examine the form with reference to what you require. Then the question of early maturity and aptitude to fatten will be important. Then constancy of characteristics as shown in the progeny must be attended to, since this shows a perfect line of superior breeding, most valuable in any kind of farm animals. In all farm animals tractability and quietness of disposition are essential. In swine this is especially so. The subject of uniformity in the progeny is referred to in cattle under the title "heredity." It is worth reading again in connection with swine.

V. Form and Feeding Qualities.

Once you have secured an improved breed, or if you have made one by judicious crossing and selection, not only hold it so, but continue to improve it. Careful selection of animals that show the best points, is the important integer here, and the fixing them by breeding such animals



A GROUP OF CHESTER WHITE BOARS.

together in connection with good shelter and feeding is another. The best breed that ever existed, if they do not die in the degenerating process, will, if they must shift for themselves half the year, with barely enough to keep life in them the other half, soon come to look like the picture of "a back-woods hog," or that of the "prairie ranger." We see

them every day even in the best farming regions, among that class who have "no luck" in raising "critters." Why should they? They are degenerating, themselves, every day in the effort to get "something for nothing," or else for less than its value.

VI. The Care of Breeding Stock.

In a general way the same principles laid down for the care of other farm stock will apply to swine. There is one thing of special importance, however, in breeding swine, that must not be overlooked. That is the care that must be taken in not breeding too closely in-and-in. We have



FAMOUS BERKSHIRE BOAR.

shown in another part of this work that the tendency of this close breeding is to render the constitution delicate, and hence the vigor of the animal must suffer. Swine are especially susceptible to scrofula and other blood diseases, and also to inflammatory diseases. In-and-in breeding is apt to exaggerate these constitutional disabilities. For this reason special care must be taken, not only in the breeding, but in selecting for breeding purposes only those that show superior constitutional vigor. If you see a pig in a litter free from cough, that is superior in growth, and shows great constitutional vigor, save him or her by all means, for further examination. Save all such, and you will soon have stock superior to that originally bought; for the breeder of pure stock sells all indiscriminately,

except such as are actually deformed, or so far from the type that even the ignorant will notice the fault. They must do so, or else sell at such prices as to place stock out of the reach of all but the most wealthy. Once a breeder finds an animal right in every respect, some hundreds, or even a thousand, dollars over the usual price of average specimens of a breed is readily paid. Hence, in starting out, if your stock is not perfect you can easily improve it by selection and care in breeding. It is the object of this book to give the mass of farmers definite information on these points. The best breeders are already informed, and fully alive to their value.

VII. Farrowing.

In regard to farrowing, the farmer must be guided by circumstances. If the sows are expected to produce two litters of pigs a year, the first litter must come as early as March, so that the next litter may come early enough in the autumn for the pigs to be weaned and feeding before cold weather sets in.

When farrowing is expected in cold weather, a place warmed by fire heat must be provided, and the sow, especially if it be a young one, must be allowed perfect quiet. A temperature of not less than sixty-five degrees is necessary until the pigs are properly dried and take the teats. After that, they will do well under a temperature at night of about fifty degrees, yet sixty will be found better, for there is nothing more tender, or more susceptible to cold than a newly born pig, unless it be a young lamb. The sow having farrowed all right, she will generally take the boar again when the pigs are three or four days old. If not, she will not come in heat until after the pigs are weaned.

VIII. Weaning the Pigs.

The pig is born with teeth that will be ready to grind its food by the time it is two months old. We have always weaned at six weeks old, so far as spring pigs were concerned, allowing plenty of skimmed milk and butter milk, mixing, at seven or eight weeks old, a fair proportion of corn meal mush, or, better, light wheat and rye screenings ground together. Give them grass, also, as soon as they will eat it, and at three months old they may be put on clover and whole, or, better, soaked corn.

IX. Castration.

Pigs should be castrated at from two to three weeks old; never delay it longer than the age of four weeks; since they require fully three weeks to recover from its effects before being weaned.

Castration is a simple operation. Let an assistant hold the pig on its back, with its head and shoulders between his knees and with the legs spread apart. With a sharp knife, cut down into the scrotum and through the testicle, press it out from the integuments, separate this from the testicle and with a jerk break the cord; or the cord may be cut with a dull pair of shears to prevent bleeding. The pigs will generally do well enough, though there is no objection to introducing a little melted lard and salt into the wound. If there is swelling the second day, inject into the cavity a little tincture of myrrh.

X. Gestation of Sows.

Gestation in the sow is accomplished in three months, three weeks and three days, as the average time. There is a variation sometimes of twenty and even thirty days. Young or weak sows carry their young a shorter period than older and stronger ones. Once you get a good breeding sow, keep her as long as possible, since young sows are often bad mothers. A sow will remain prolific for about eight years, unless she becomes overloaded with fat, and this must be guarded against.

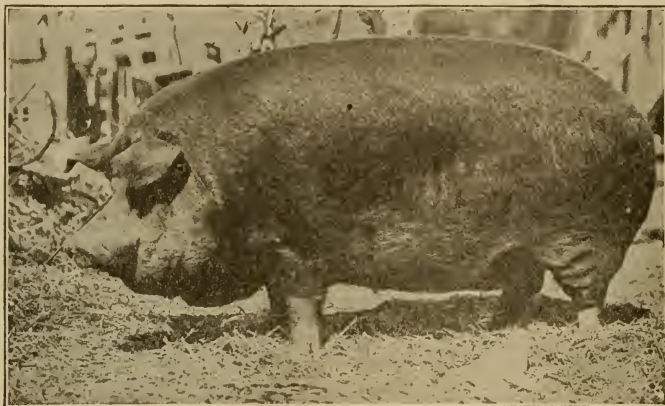
XI. Necessity of Good Care.

Swine have naturally but little hair, and artificial breeding has nearly destroyed what little they originally had. To supply this lack, nature has given them a thick layer of fat next the skin, when in good condition. Hence the necessity, not only of good feeding, but also of warm quarters and a good bed to lie in. Nature has also given them the instinct to carry together plenty of material for making their own beds, and also to lie together in families for mutual warmth. Knowing these facts, it should not be difficult for the sagacious farmer so to provide them with food and quarters, that they may be comfortable. If this is not done, and considerable numbers are kept together, they will "pile up" in cold nights so that in the morning the owner may have a chance to drag out some hogs dead from smothering. For when swine are piled up two or three thick, the under layer have no longer the power to move if they should try.

XII. Ringing a Hog.

We do not believe in ringing swine, except fattening stock and those fed in the fields with a view to fattening. We believe it one of the most prolific causes of disease and contagion, especially in preventing them from getting their natural food. Breeding stock should never have rings in their noses, at least until they are ready to be turned out for fattening.

Nevertheless, we suppose many will not think so. We have reference to the old fashioned way of hampering a hog for ringing, and also the ring; now-a-days patent rings and ringing pincers render the process more easy.



DUROC JERSEY SOW—ONE YEAR OLD.

The old method was both clumsy and cruel; and except when necessary, rings of every kind should be discarded.



CHESTER WHITE BOAR.

A hog that is turned out to forage in the woods on mast and roots should not, of course, be ringed; for he then needs free use of his snout which is the means nature provides him with for getting food. The reason why breeding swine should not be ringed is, that the natural exercise of rooting, and the food they get in this way, are necessary to develop constitutional vigor and perfect health, so important in all breeding stock. This point is touched upon more fully elsewhere.

CHAPTER IV.

THE FEEDING AND SHELTERING OF SWINE.

- I. FEED THE BREEDERS FOR HEALTH.—II. THE PROPER FOOD FOR SWINE.—
III. SUMMER FEEDING FOR PORK.—IV. GRASSES AND CLOVERS.—V. ROOTS.
—VI. GRAIN THE MAIN RELIANCE.—VII. FEEDING IN THE FIELDS.—VIII.
GLEANNING IN THE FIELDS AND AFTER CATTLE.—IX. VALUE OF MAST FOR
HOGS.—X. HOG-FEEDING IN THE SOUTH.—XI. FEEDING IN CLOSE PENS.—
XII. HOG BARN.—XIII. THE BEST FORM OF HOG BARN.—XIV. COMPARATIVE
VALUE OF LIGHT AND HEAVY HOGS.—XV. ECONOMY OF FULL FEEDING FROM
BIRTH.—XVI. MIXED RATIONS FOR HOGS.—XVII. GRAIN SHOULD BE GROUND.
—XVIII. WET FEED BETTER THAN DRY.—XIX. COOKING FOOD.—XX. FEED-
ING POTATOES.—XXI. PUMPKINS FOR HOGS.—XXII. CONCLUSION.

I. Feed the Breeders for Health.

The only profit that can accrue from the care and management of swine lies in the value of their flesh as food, and in the offal for grease and in the arts. Hence the greatest profit—except in rare cases, where they have an unlimited forest range—lies in forcing their feeding to fatness, from birth until they are slaughtered. True economy will dictate that they have the warmest possible shelter in winter, and that they be kept cool in summer, with some place where they may escape from insect enemies, and with range sufficient for them to exercise their instinct of rooting for such underground vegetation as their natures may require. This promotes health and strengthens their constitutions.

The above applies especially to the breeding stock. Those animals which are intended for fattening—and whose lives should not extend beyond fifteen months at most—do not require all this. If the breeding stock have been kept healthy they will transmit health to their offspring. I believe that the purely artificial breeding and feeding of breeding stock, the indiscriminate ringing, the absence of roots, and the feeding of breeding animals almost exclusively on corn, have, in many cases, so enfeebled the constitution of swine that they have become an easy prey to the various epidemic and contagious diseases that, of late years, have carried off so many. And I believe, also, that the utmost care will be necessary in the future to guard against this disability. And any common-sense man may see that the breeding animals are so few in proportion to the slaughtering swine, that it is true economy for every breeder to spare no pains in providing for this class of stock diversified food which they crave, and which is necessary to make sound and vigorous constitutions.

Remember that swine—like man—are universal feeders, and that if allowed to be so, few animals are more cleanly in their habits. They wal-

low in the mud, at times, it is true, but a mud bath is nature's specific for scurvy and other skin diseases. Swine, also, take a mud bath as refuge from insects; nevertheless they are careful, if allowed, to thoroughly clean themselves, when dry, against the rubbing post.

II. The Proper Food for Swine.

Swine eat fewer varieties of herbs and grass than any other animal. Pig-weed (*amaranth*), pursley (*portulacca*) and various other succulent plants, with the common pasture grasses, and red and white clover are about the only ones swine will feed on. Artichokes and various tuberous and bulbous roots, many insects—especially the larvæ of the May beetle, and the white grub of our pastures—frogs, and such small animals as they can kill, together with all the edible grains, and culinary vegetables, constitute their natural food. In fact, they eat few substances that would be injurious to man. Such, then, is their proper food—so far as it may be obtained—if the highest constitutional vigor is to be preserved in the breeding stock. If they are allowed a fair range on clover, including the gleanings of grain fields in summer; and if a good supply of pumpkins, and the refuse fruit of the farm be allowed them in autumn; and if in the winter they be allowed daily rations of artichokes, small potatoes, parsnips or carrots, they may have, in addition, what grain they need to keep them in full flesh—not fat. If this course of feeding were generally adopted for the breeding stock, we should in a few years hear but little of the epidemics which periodically sweep the swine away by thousands. But as long as there are so many breeders who never look beyond present profits, these epidemics will probably continue to be bred among the herds of this class to scatter the germs far and wide.

III. Summer Feeding for Pork.

We now come to the care of fattening stock. The pigs having been weaned, as already directed, give them the run of a clover pasture; and, while we object to the ringing of breeding stock, with those intended for fattening it is, perhaps, less objectionable than the tearing up of the grazing fields. But if the grazing fields are infested with the larvæ of the May beetle or similar insects, the fattening hogs may as well be allowed to root as much as they want to. There is no cheaper way of ridding the land of these pests.

In addition to clover, give the young pigs all the milk and other slops of the house, and also give what corn they will eat; older pigs will do well enough on clover and corn, without the slops. Whether the grain shall be ground, or ground and cooked, will depend entirely on the price. We have always found whole grain the cheapest, except for finishing off,

when the price of corn was fifty cents per bushel or less ; and here again economy will depend more or less upon the facilities for grinding and for cooking.

IV. Grasses and Clovers.

The main dependence for grazing will be blue grass, orchard grass, and red and white clover. Alfalfa—wherever it will grow—cut green, makes an excellent supplementary food, when swine get used to it ; and field peas cut just before they shell are excellent for hogs.

V. Roots.

Artichokes, potatoes, ruta-bagas, parsnips, carrots, and beets, are readily eaten by swine, and are preferred in the order named. We have successfully wintered store hogs entirely on ruta-bagas with the addition of a little meal. Artichokes are a cheap and excellent root food, if the swine are allowed to gather them themselves in the autumn and spring.

VI. Grain the Main Reliance.

Grain, however, is, in the West, the cheapest food and the main dependence of the farmer. The other foods are useful mainly for keeping the animal in good health and digestion ; for, without sound health and good digestion, no animal can be made fully fat. In the fall there is no better food than pumpkins and grain boiled together ; and if the pumpkins are protected from frost, swine may be carried in this way until Christmas and made fully fat.

VII. Feeding in the Fields.

In all the great corn region of the West and South, field-feeding will long continue to be the favorite way of fattening hogs. It is cleanly, and, where grain is cheap, economical. It is only necessary to see that the hogs are made comfortable by shelter from storms and cold weather, and that they have plenty of pure water. This is so easy to do that the mere mention of it will suffice.

VIII. Gleaning in the Fields and after Cattle.

Swine should always have the run of the grain fields after harvest, if possible. In this way they save all the grain dropped in harvesting, and, most important, they get a variety of herbage, which they could not otherwise obtain. It should, of course, not interfere with their getting full rations of grain, and plenty of pure water for drinking must be provided, for swine are thirsty animals ; and attention to providing a dark place where they may escape insects must not be forgotten.

So, in feeding cattle, swine should glean what is left. One or two hogs should follow each steer or cow, according to how much grain is fed to the hogs in addition. Our plan always was, to allow two hogs to each steer, and then at night to give the hogs what extra corn they would eat.

IX. Value of Mast for Hogs.

This will depend upon the range and the number of nut-producing trees. When a suitable range is to be had it should always be used, especially for breeding hogs, and young swine. For fattening, it will only be available in extensive forest districts, and for half-wild swine. In any event, hogs fed on mast should be allowed full feeds of grain for at least three weeks before slaughtering.

X. Hog Feeding in the South.

Swine-feeding can be profitably conducted on a large scale at the South, only in the more temperate regions where corn may be economically grown. There is, however, still so much forest area there, that it should be made use of to the fullest extent for hog pasture, on account of the natural roots, the wild fruit and the mast. The supplementary food must depend, as it does everywhere else, on the cost. If it has to be bought, corn and mill feed will be found the cheapest. Every planter should raise and cure enough hogs to furnish pork, bacon and hams for his home use. It will be found, in nearly every instance, cheaper than to buy the bacon and pork already prepared.

XI. Feeding in Close Pens.

In all cases, where few pigs are kept, or where only the family supplies of pork are fattened—especially when the fattening pigs are bought in the spring—it is cheapest to feed in close pens. These should always be in two apartments, one closed in for sleeping, and the other an open platform for feeding. A pen twelve by sixteen will accommodate six large hogs; and this will allow the sleeping room to be 8 by 12, and the feed room the same size. In every case where hogs are to be kept and fattened in cold weather, warm sleeping places must be provided; and even where large numbers of hogs were kept to be fed fully fat, we have found the plan of close pens to be most economical in the end.

XII. Hog Barns.

When many hogs are kept, a permanent structure should be built for fattening and wintering them. The simplest form of a hog barn is a low building, with ranges of pens on each side of a four-foot passage way, the sides being divided into pens eight feet square. This would give twenty feet for the width of the building. In the middle, a twenty-foot room should be left for the boiler, and for the storage of feed. The

sleeping apartments may be lean-to structures, back of the feeding rooms, and with a door to each, hung on hinges at the top, so it may easily swing either way when a hog pushes it. The pens must be cleaned into a wheelbarrow, rolled along the passage on a running way laid for dumping directly upon the compost heap.

XIII. The Best Form of Hog Barn.

The best form of hog barn we have ever used was a central building, twenty-four feet square and two stories high; the upper stories arranged with bins for meal, and a corn crib, with chutes running below. The twelve-foot-square in the center of the lower story is used exclusively for the cooking apparatus, the first range of pens adjoining being for breeding sows and the younger pigs, since it is the warmest part of the building. Thence wings extend on each of the four sides, as in the plan of a hog barn first described, except that this being intended for both winter and summer feeding, a door communicating from the sleeping pens to a yard beyond should be added.

In this way we have kept five hundred hogs, and, by proper attention to their feeding and sanitary condition, always breeding our own stock with but slight loss from epidemics. The water supply was ample and pure. The pens were kept regularly washed; the offal was carried to the compost heap and covered regularly with earth; and the hogs had always by them ashes and salt, and also a supply of bituminous coal slack. For cut of hog barn, see page 980.

XIV. Comparative Value of Light and Heavy Hogs.

We have heretofore shown that an animal, if allowed to lose flesh when growing, does so at the expense of ultimate profits. This is especially true of swine. No feeder can afford to winter pigs with a view of getting heavy weights, unless under exceptional circumstances. It costs too much. Hogs weighing from 400 to 600 pounds will not bring so much per pound as lighter fat hogs, and with hogs as with other stock, every year they are kept their daily gain becomes less and less.

Hogs weighing 200 pounds, or thereabout, will bring more money in any market than those of any other weight; for hogs of this weight cut up better into hams, bacon, and family side pork, than heavier ones. No one wants a ham, for instance, that will weigh twenty-five to thirty pounds; there is too much fat on it for the lean. Thick bacon does not sell well, for very fat bacon is not liked. Hogs if properly fed may be turned off weighing 200 to 250 pounds at nine months old; and under ordinary good feeding, at ten or eleven months old. We have

raised pigs, farrowed in March, that in the succeeding January killed to dress up to 380 pounds, and have turned them off several times, that, at ten months old, would average 300 pounds alive.

To put the thing in a nut-shell, it is altogether cheaper to feed three pigs to 200 pounds each at nine months old, than it is to feed a hog three years to make him weigh 600 pounds; and again, if the pigs are worth six cents a pound alive, it is \$36; the 600 pound hog will not then bring more than five cents, or \$30, and has eaten more corn than the three lighter hogs.

XV. Economy of Full Feeding from Birth.

It should be remembered that it takes a certain percentage of the food to supply daily animal waste. The young animal converts into flesh more of the food given than a full grown one; no matter how long the animal is kept the daily waste goes on constantly. Hence, it should require no argument to show that the true economy is to feed strong from birth, if the object be simply to sell the animal when fat. When fat, sell at once, unless the state of the market is such that it will pay to hold for a time. Above all, do not allow the animal to fall away at any stage of growth, since it must be brought back at an increased cost of food over that originally given, to bring it to the condition at which it began to fail.

XVI. Mixed Rations for Hogs.

To determine the feeding value of a mixed grain ration as compared with one of a single kind of grain, numerous experiments have been conducted, and in every case the results favor a mixed ration. This is one strong reason why a superior quality of pork can be produced in the Northwest, where such a large variety of grains and forage plants can be grown.

In corn-growing sections there is a disposition to feed corn almost exclusively on account of its cheapness, its fattening qualities, and the relish with which it is eaten. While in many sections we can not grow corn successfully as a grain crop, we can grow a long list of other cereals, such as oats, barley, wheat, millet and rye; and we can grow them cheaply with very little danger of failure. As no artificial fertilizer is needed to grow these crops in the Northwest, the cost of production is low enough to make them cheap stock foods. A mixture of chopped wheat, oats, and shorts will give better results than a single grain of any sort, not excepting corn. A mixture of this kind is usually cheaper than wheat alone, and will produce better gains. Chopped oats should not be fed alone. The hulls interfere very materially with its value as food for hogs. They do not enjoy the hulls, and will refuse to eat the oats quicker than any other



WHITE YORKSHIRE HOGS.
Prize Winners International Show.—Specially photographed for this work.

grain except bran, which they do not relish, principally for the same reason. Chopped barley and shorts make a good combination for feeding. A small amount of bran can be used to good advantage when mixed with other grains. Shorts alone will not furnish mineral matter enough for growing pigs.

XVII. Grain Should be Ground.

Small grain should be crushed or ground for hogs. When fed whole there is less gain to amount of food consumed, and the total gain in a given time will be less. It is a too common practice among farmers in this section to follow slovenly methods in feeding stock. Instead of getting a few feet of cheap lumber for a floor on which to feed, or making a few troughs, whole grain is strewn on the ground for the hogs to gather up as best they may. Often the rainy season begins before the hogs are sold; then the feed yard becomes a slough of mud, out of which the animals work very assiduously to gather their daily food. This may be an extreme picture, but who has not seen it many times in this Western country?

In feeding experiments it was found that it required 1.2 pounds more of whole wheat and oats to produce a pound of gain in live weight than it did with ground grain fed under the same conditions. In many cases the excreta were examined to determine the amount of undigested whole wheat present, and it was found that as much as 50 per cent passed off unmasticated. This condition was more marked when the grain was fed dry, but at all times there was a very great loss.

XVIII. Wet Feed Better than Dry.

Hogs relish a moist diet better than a dry one, and will give better returns for the same food fed after soaking a few hours than when fed dry. Soaking grain from twelve to twenty-four hours pays well for the extra trouble in preparing the food. The old practice of permitting the feed to ferment and become a source of great annoyance, on account of the offensive odor it gives off, is no longer followed by the intelligent feeder.

XIX. Cooking Food.

The practice of cooking grain for hogs has long since been discouraged as of doubtful economical value. Pound for pound, the raw grain will give the best results, and when the extra cost of cooking is taken into account, the results are very much in favor of feeding the grain raw. In case of vegetables it is quite different; for the feeding value as well as the palatability of most vegetables is improved by cooking.

XX. Feeding Potatoes.

Very often potatoes become so cheap, on account of an increased supply, that it would pay better to feed them to hogs than to sell them on the market. Hogs can be made to gain rapidly on a ration of cooked potatoes to which is added shorts, chopped wheat, oats or barley. In experiments conducted at the Oregon station, pigs made a daily gain of 1.3 pounds on an average ration of 12.4 pounds of potatoes, and 2.8 pounds of chopped oats and shorts mixed half and half. The results of experiments indicate that the value of potatoes for feeding to hogs is about 10 cents per bushel. This value will vary, however, under varying conditions of market and methods of feeding.

XXI. Pumpkins for Hogs.

Not much has been done in an experimental way in feeding pumpkins to hogs, but in practice many farmers in the West feed pumpkins very successfully. Experiments were carried on at the government station to determine the value of pumpkins as a part ration for hogs, with the following results: They were fed from October 10 to December 25. The pumpkins were cooked and shorts were added to make the food palatable. The hogs gained 499 pounds, and consumed 7,523 pounds of pumpkins and 924 pounds of shorts. Placing the pumpkins at \$2.50 per ton, and the shorts at \$12 per ton, the total cost would be \$14.94. This makes the cost of 100 pounds of gain in live weight \$2. This is the cheapest pork produced from any combination of food materials tested at the Oregon station. The pumpkins were valued at the estimated cost of production. The pork produced by this feed was pronounced first-class for bacon purposes. The hogs were healthy and were never off their feed throughout the feeding period.

XXII. Conclusion.

Hogs free from disease.—Hogs in the Northwest are generally very free from disease. Hog cholera is practically unknown in Oregon, Washington, and Idaho. No well-defined cases have, so far as we are aware, developed within this region, although cases have been reported where hogs were imported from cholera-infected districts in the Eastern States. Our methods of feeding, together with a greater variety of food material, is conducive to the health of the animals. The comparatively small proportion of corn fed is an advantage to health. Corn, being a highly carbonaceous food, induces more animal heat, and should be mixed with some food rich in protein to give the best results, both as affecting the health of the animals and the quality of the product. Where wheat,

oats, barley, peas, alfalfa, and clover, constitute the chief food supply, there is little danger of disease.

Prospect of the industry.—In conclusion it may be said that there is a broad field for the farmers of the Pacific Northwest to occupy in producing a superior article of bacon and other pork products. The climatic and feed conditions are the very best that can be found for producing a grade of pork which can not be excelled in the world.



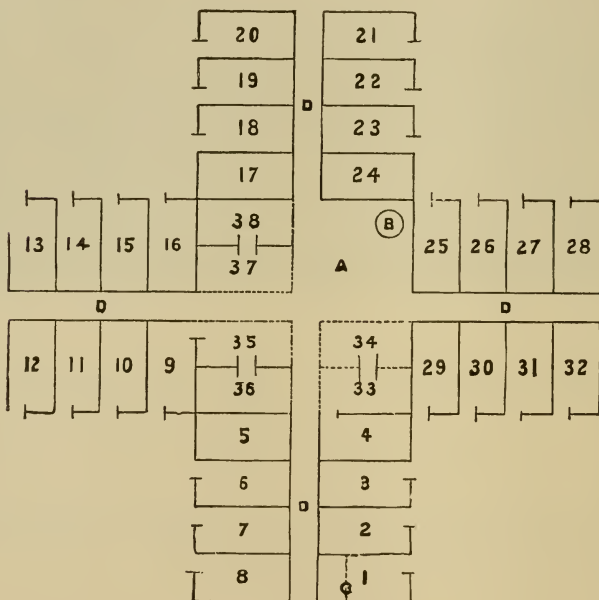
VICTORIA BOAR.

There is not a day in the year, over large areas in this section, when hogs can not have some form of green succulent food. Pastures of clover, grasses, and annual plants can be provided that furnish a large amount of food which, supplemented with a small ration of grain, will produce a superior article of meat products. The foreign as well as the domestic market demands a better pork product, especially in the hams and bacon.

With good blood in the herd as the first essential, and then a proper food supply, the results will be wholly satisfactory.

Paralysis behind, "downers":—Pour a tablespoonful of turpentine across the loins once a day for several days. Give coperas and sulphur, a teaspoonful of each for three successive days and repeat in a few days if necessary. Prevention: Give all of the soft coal, charcoal, etc., that they want to eat.

Sows Eating their Pigs:—This is due to a depraved appetite while in a delirious condition brought on by parturition. All sows are apt to do it during the first few hours following delivery. The only remedy is to watch her during delivery and remove them as fast as they come, and put them in to her to nurse at intervals of two hours, watching them closely, then remove them. Continue this for three or four days, when the danger of eating them will have passed.



HOG HOUSE.

For description see page 975

Thumps in Pigs:—Separate from the rest, feed liquid food and give about five gr. of tinct. of digitalis twice a day.

Black Teeth:—These are found upon the inside of the pig's mouth, often cutting the tongue so as to interfere with eating. Pull them out.

BOOK III

PART II

Diseases of Swine

HOW TO KNOW THEM; THEIR CAUSES, PRE-
VENTION AND CURE



YORKSHIRES.
Specially photographed for this work.

DISEASES OF SWINE.

CHAPTER I.

MALIGNANT AND EPIDEMIC DISEASES.

THE PREVENTION OF DISEASE.—II. MALIGNANT EPIZOOTIC CATARRH.—III. CONTAGIOUS FEVER OF SWINE.—IV. CONTAGIOUS PNEUMO-ENTERITIS.—V. SPLENIC FEVER, OR MALIGNANT ANTHRAX.—VI. SUMMARY OF TREATMENT FOR MALIGNANT DISEASES.—VII. RULES FOR DISINFECTION.—VIII. DIFFICULTY IN GIVING MEDICINE TO SWINE.—IX. WATCH SYMPTOMS EARLY, AND USE PREVENTIVES.

I. The Prevention of Diseases.

In the care of swine the prevention of disease is of the utmost importance. They are, indeed, subject to comparatively few ailments; but these few are, generally, in the shape of malignant, epidemic or contagious diseases of the most serious kind. In such cases the difficulty in administering medicine (they being too sick to take it with food) is very great. To prevent disease in swine, the most important thing is so to care for the animals that they shall be kept in general good health. The admission of other swine among the herd should, also, be prohibited until you are well assured that the new comers are free from disease. The herd should be perfectly isolated during the prevalence of epidemic or contagious diseases, and disinfectants should be freely used; when once serious disease makes its appearance in the herd, the sick animals should be carefully separated from the well ones. There is only one economical way to treat so-called hog cholera, which may appear in any of the following forms, viz: malignant epizootic catarrh; intestinal "hog cholera," a specific contagious fever, attended by congestion, exudation, blood extravasation, ulceration of the membranes of the stomach and bowels, and foetid discharges; contagious pneumo-enteritis or purples, a contagious inflammation of the stomach and bowels, with red or purple blotches of the skin; or the erysipelatous form of pneumo-enteritis, or that attended with malignant sore throat. When either of these forms of disease attacks swine, the cheapest way to treat it is to send the animals at once to the rendering tanks, and convert them into "grease," or kill and bury them at once, and thoroughly disinfect every possible place where contagion may lurk. If a competent veterinarian be near, apply to him at

once; but beware of quacks who go about doctoring hogs with so-called specifics; they are a delusion and a snare for the unwary.

II. Malignant Epizootic Catarrh.

Causes.—This disease, if not actually generated in filthy yards and pens, is quickly and fatally developed in such places, and the poison germs quickly find their way to the mucous membranes of the animals. Anything that suddenly checks the insensible perspiration, as a cold, will quickly predispose to the disease.

How to know it.—There will be difficulty in breathing; panting; lifting of the flanks, and a short hoarse cough. There is fever; the head will be stretched out and drooping; sometimes running at the nose; efforts to vomit; generally constipation, but sometimes diarrhœa; and the animal will show a stiff tottering gait. After death, if the animal is opened, there will be found inflammation of the nasal passages of the upper part of the throat, and of the windpipe and lungs, which latter will be found more or less solidified.

A second form of the disease shows less cough; less difficulty in breathing, but decided paralysis, and tottering in the gait; there is constipation, followed by profuse and fœtid diarrhœa; the back arched; partial or total blindness; enlarged glands and scrofulous ulcers. After death the lining membrane of the intestines will be enlarged and degenerated; the spleen enlarged, soft and dark; the liver is also affected, and there may be water exudations in the chest and belly. The duration of either form will be about fifteen days.

What to do.—If the disease shows clearly the symptoms described, kill the animal and bury it deep. Separate all animals showing the slightest ailment, and give the following emetic:

No. 1.	15 to 20 Grains, powdered white hellebore
	$\frac{1}{2}$ Pint milk

Mix and let the animal drink it, if it will; if not, turn it down with a horn, as described under Article VIII, in this chapter. When the dose has vomited the animal, if the symptoms are as first described or in the lungs, give

No. 2.	2 or 3 Grains tartar emetic.
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If the symptoms are as described in the second form of the disease, or if the bowels are implicated rather than the lungs, give, instead, the following:

No. 3.	2 or 3 Grains calomel.
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Either dose may be administered in the half of a roasted potato if the animal will eat. If not, envelop the dose in lard and place it well back

in the mouth on the root of the tongue. Apply over the sore spot, lungs or bowels, as the case may be, the following blistering ointment :

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| No. 4. | 1 Ounce powdered cantharides,
4 Ounces olive oil. |
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Heat the two over a moderate fire for half an hour, stirring constantly, and rub it in well, repeating if it does not blister on the first application.

So soon as the animal gets relief, if the disease is in the lungs, give the following, every day for a few days ; but if the trouble is in the bowels, omit the carbonate of potash :

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| No. 5. | 20 Grains sulphate of iron,
30 Grains carbonate of potash. |
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If there are copious, dark discharges from the bowels, give

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| No. 6. | 20 Grains podophyllin,
2 Drachms bi-carbonate of soda,
Mix in a pint of milk. |
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But, if there be constipation, give the following instead of No. 6 :

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| No. 7. | 1 Ounce castor oil,
1 Drachm oil of turpentine.
Mix in a pint of milk. |
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III. Contagious Fever of Swine.

This is sometimes called intestinal hog cholera.

Causes.—It is contagious and the infection is virulent, so much so that the germs are carried to considerable distances, supposably in the air. If not generated in foul pens and yards, they, together with bad care and management, cause it to develop quickly when the germs are once introduced.

How to know it.—Succeeding the incubation, which lasts from three days to two weeks, according to the season and temperature, there will be shivering ; prostration ; the nose hot and dry ; the animal will not feed, but will lie under the litter ; the eyes will be sunken ; the gait weak and unsteady. There will be great thirst, and a clinical thermometer inserted into the rectum will show a temperature of 103° to 105° F. There will be heat and soreness of the skin, with red patches and black spots, the redness disappearing under pressure. The pulse will be weak but rapid ; the tongue much furred ; a hard dry cough, and quick breathing ; the belly is sore and the animal will flinch and scream if it is handled ; the bowels are costive sometimes throughout the disease, but generally as the disease progresses, or about the third day, diarrhœa, fœtid and exhausting, will supervene, and slime and blood may be passed, showing ulceration of the bowels. The last stage occasions stupor, paralysis of the hind limbs, with tremblings, jerking of the limbs and involuntary motions of the bowels.

What to do.—Kill and bury deeply all infected animals, unless they can be treated in a place where the atmosphere is constantly disinfected. Disinfect, also, all animals that may be near. Separate all animals in which the clinical thermometer, inserted into the rectum, shows a temperature of 100° F. or more. Give them charcoal, bi-sulphate of soda, 20 grains at a dose, mixed with the same quantity of nitrate of potassa; give also sulphate of iron (copperas), or the following:

No. 8.	2 Pounds flowers of sulphur,
	2 Pounds sulphate of iron,
	$\frac{1}{2}$ Pound nitrate of potash,
	$\frac{1}{2}$ Pound black antimony.

This mixed in twelve gallons of slop will be enough for 100 hogs; or give each hog 1 pint at a dose, repeating every day.

Be sure the water used has not run through the premises of a diseased herd; use only pure well water, and be sure, also, that the food has not been contaminated; and if you have lately bought strange hogs, isolate them in a safe quarantine until assured they are all right.

Treatment of the sick.—Give cool pure well water, just acidulated with sulphuric acid, to drink. If there is constipation, give a mild dose of castor oil, say two ounces, and also give injections of warm water to assist the operation. Then give the following dose, repeated two or three times a day.

No. 9.	20 Grains nitrate of potassa.
	20 Grains bi-sulphate of soda.
	Mix in a pint of gruel, and give as one dose.

If the belly becomes tender, and bloody dung is passed, showing ulceration of the bowels, give fifteen or twenty drops of oil of turpentine, in a little gruel, night and morning. When the worst cases show signs of improving, give tonics, say 5-grain doses of quinine twice a day; or $\frac{1}{2}$ drachm doses of sulphate of iron (copperas). This with nourishing, soft food, such as boiled or scalded oats and bran in equal parts, no corn, good nursing, and a most thorough disinfection (see Article VII), may bring them out.

IV. Contagious Pneumo-Enteritis.

This is a form of so-called "hog cholera," or purples. It is a contagious inflammation of the lungs and bowels with red or purple blotches on the skin, according to the relative form of the disease.

Causes.—Bad water, and malaria from filthy pens or swampy grounds, are prolific causes in hot or warm, wet seasons. A minute organism (*bacillus*) is found in the serous fluids and tissues of the body.

How to know it.—Charbon or malignant anthrax, also called hog cholera by those who want a better name, is sometimes confounded with

this disease. In some respects, indeed, the ignorant may easily confound them. Hence we give the symptomatic distinction of each, side by side, as stated by Dr. Klein :

CONTAGIOUS PNEUMO-ENTERITIS.

—Period of incubation from two to five days and more.

Rarely and with difficulty transmitted to other species.

Spleen rarely enlarged or otherwise changed.

Blood after death of ordinary appearance.

No *bacillus anthracis* in the blood, but numberless bacilli in the serum of the thorax and abdomen.

Lungs and bowels *always both* inflamed. Cough always present.

The red or purple color diffused over the surface, and of an erysipelatous appearance.

There are two forms of pneumo-enteritis, one the erysipelatous form, the other with malignant sore throat.

THE ERYSIPELATOUS FORM.—The animal is dull ; will not eat ; is unwilling to move ; tries to vomit ; there is cough ; difficulty in urination ; the bowels are constipated ; the dung hard and black. Then dark red or purple blotches passing into bluish-black will appear about the ears, throat, neck, breast and between the fore-legs. There may be a discharge of dark or purple fluid from the nose ; the breathing becomes labored, even to panting ; there is paralysis of the hind limbs ; if the animal is forced up, his head will drop to the ground, and he walks with a reeling gait behind. Fœtid diarrhœa sets in, and the animal dies in from one to three days.

WITH MALIGNANT SORE THROAT.—The symptoms in the commencement are the same as in the erysipelatous form, with a red and purple line about the throat ; there are attempts to vomit ; difficulty in swallowing ; and the sensation of choking in breathing is so intense that the animal will sit on his haunches, gasping for breath with livid, protruded and swollen tongue. The symptoms so increase, sometimes, that the swelling of the larynx will kill, by choking, in an hour.

What to do.—Foment the swollen parts with hot water, saturated with sulphate of iron (copperas). If there are signs of gangrene, saturate the

TRUE CHARBON.—Period of incubation, or latency, from a few hours to three days.

Easily transmissible to other species of animals.

Spleen always enlarged, and often broken down.

Blood after death dark and fluid.

Bacillus anthracis in the blood.

Lungs and bowels frequently not implicated. Cough may be present.

The discoloration local, and of a true carbuncular appearance.

surrounding parts with equal parts of turpentine and sweet oil. Give at once two ounces of castor oil, and when it operates, give the following two or three times a day :

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| No. 10. | 20 Grains nitrate of soda, |
| | 20 Grains nitrate of potash. |
| | Mix in a little gruel. |

If the bowels are swollen and tender, give twenty drops of turpentine in a little gruel, as may be needed, and let the animal have powdered charcoal in the water it drinks.

Another valuable remedy is that of M. Lubin, to be given in gruel three times a day, omitting the calomel after the third dose. It is as follows :

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|---------|-----------------------------|
| No. 11. | 5 Grains calomel, |
| | 1 Drachm nitrate of potash, |
| | 10 Grains powdered camphor. |

This is a good dose for the swine not yet affected, and it may be used in any of the preceding diseases, as a preventive. The following has been found useful by Prof. J. B. Turner, of Illinois. It will be sufficient for 100 hogs, the dose being one pint for each hog :

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|---------|--|
| No. 12. | 2 Pounds flowers of sulphur, |
| | 2 Pounds sulphate of iron, |
| | 2 Pounds madder, |
| | $\frac{1}{2}$ Pound black antimony, |
| | $\frac{1}{2}$ Pound nitrate of potash, |
| | 2 Ounces arsenic. |

Mix the whole in twelve gallons of gruel for 100 swine, or give one-pint doses to each.

V. Splenic Fever or Malignant Anthrax.

This disease is rare, and has even been asserted as not occurring in the United States. Yet, since charbon or malignant anthrax of cattle may be easily communicated to other animals and man, there is no reason why swine should not become victims.

The common form of Anthrax.—In pigs the most common form is a carbuncular swelling of the throat, extending inwards to the windpipe and gullet, causing difficulty in breathing and swallowing, and terminating in convulsions and death by strangling. It has been popularly known as white-bristle, from the peculiar appearance of the bristles about the parts. The treatment should be similar to that advised for pneumo-enteritis with malignant sore throat. (See article IV.)

The apoplectic or splenic form.—If this form of the disease should appear, it will be known by malignant inflammation of the internal organs, such as are noticed in bloody murrain in cattle. It is malignant blood poisoning, and so virulent is the infection that every tissue of the animal

is affected, and is poisonous to both man and beast, producing what is known as malignant pustule, if serum or blood or the flesh of the infected animal comes in contact with any abrasion of the skin.

Prevention.—Perhaps as good a preventive as any is prescription No. 12. But every animal infected had better be killed at once and buried deeply, and covered with quick lime.

VI. Summary of Treatment for Malignant Diseases.

As a last word, however, we repeat: Do not waste time in doctoring any but blooded hogs that are valuable enough to warrant perfect isolation and the necessary care in curing. The best precaution to take in all the diseases named, and which go under the general name "hog cholera," is disinfection, and the most thorough isolation of the sick from the well. If the sanitary conditions of the hospital are not strictly attended to, all other treatment is thrown away; and the attendants must thoroughly disinfect themselves before going about other swine. In fact, it is better that the attendants keep away from the well hogs altogether. Hence our advice: Thoroughly isolate all swine upon the first indication of disease, and if it does not give way quickly to treatment, kill and bury deeply at once.

VII. Rules for Disinfection.

The rules we give for disinfection, will apply to any structure, including barns, stables, sheds, and outhouses of every kind. Fumigants are not always disinfectants, and simply deodorizing or destroying odors, is not disinfection in any sense of the word.

The disinfection of all barns, stables, sheds, or other places where animals having malignant or contagious diseases have been kept, should receive strict attention. Every part should be stopped tight, and flowers of sulphur and wood tar, in the proportion of one pound of the former to two quarts of the latter, mixed with tow, should be burned and allowed to smoke thoroughly, until the whole building is thick with smoke. So the hospital should be fumigated with the same, two or three times a week, but not sufficiently to set the animals coughing. Every part of the building should also be thoroughly washed with dilute carbolic acid, and the clothing also wet with it. If pure carbolic acid is used for sprinkling floors or washing walls, 100 parts of soft water may be added to one pint of acid. The impure carbolic acid of gas works may be used undiluted. All discharges should be treated with chloride of zinc, dissolved in water, in the proportion of one ounce to one or two gallons of water. The attendants taking care of animals with malignant diseases should never approach or handle the well ones.

A disinfectant that has no smell and is not poisonous, known as chloralum, is made by dissolving three pounds of chloride of aluminum in two gallons of water, or in like proportions. Another cheap and powerful disinfectant, but poisonous, if taken, is made of eight ounces of chloride of zinc, sixteen ounces of sulphate of iron, and one gallon of water. Dissolve, and to each pint used add one gallon of water. Among disinfecting substances may be named chlorine. This is set free by adding oil of vitriol and a little black manganese to common salt, as a disinfectant of the air, but must be used in vacated buildings, and is better if used in the full light of day. So flowers of sulphur, burned by a heat only sufficient to produce smoke, will accomplish the same purpose, and if used carefully, it will not injure stock. A disinfectant that may be used in occupied buildings is formed by adding a little chlorate of potassa, at short intervals, to half a pint of strong muriatic acid, in a strong vessel of glass, or heavily glazed stoneware.

VIII. Difficulty in giving Medicine to Swine

The difficulty in administering medicine to swine is well known. The usual way is to fix a slip noose about the upper jaw and draw up the head, the obstinacy of the hog prompting him to pull steadily back, bringing the hinder parts to the floor. In this position liquids may be administered from a horn. The difficulty is the struggles of the animal frequently do injury. In most cases if the hog is placed in a chute where he cannot turn around and he be given an old shoe to bite on, having a hole in the end, the medicine may be poured in the shoe and it will be taken in champing the end. Another device lately recommended is to take a pine board three and one-half inches wide and ten or twelve inches long, including a handle whittled down at one end. At about three inches from the end cut a notch one and three-fourths inches deep and three inches wide. On the other edge of the board, about opposite the middle of the first notch, cut another notch about one inch square, then cut down the end of the board for a handle. Let one hold the hog while the other drenches him. Catch the hog by the ears and set him back on his hind parts. Place the board in the front part of the mouth, small notch down; pour the medicine in the front part of the mouth, on the end of the tongue, from a strong bottle. Pour slowly, and give time to swallow. Be careful not to strangle him. The size of the stick must vary according to the size of the hog. In case doses in the form of pills or paste are to be given, place them well back on the root of the tongue.

IX. Watch Symptoms early and use Preventives.

The "ounce of prevention" in the case of swine, is worth many times more than the "pound of cure." Good nursing, isolation and thorough disinfection are really the chief, as they are the common-sense treatment. This has always been our practice, in connection with prompt killing and deep burial of those which did not yield to simple treatment. Any person by carefully studying what we have written, may pretty accurately judge when killing becomes necessary.

CHAPTER II.

THE COMMON DISEASES OF SWINE.

- I. INFLAMMATORY DISEASES.—II. PNEUMONIA OR INFLAMMATION OF THE LUNGS.—III. QUINSY OR INFLAMMATION OF THE TONSILS.—IV. APOPLEXY, STAGGERS, OR CONGESTION OF THE BRAIN.—V. COLDS OR RISING OF THE LIGHTS.—VI. CATARRH OR SNUFFLES.—VII. MEASLES AND TRICHINA.—VIII. TRICHINA SPIRALIS.—IX. OTHER INTESTINAL PARASITES.—X. PARASITES OF THE SKIN—MANGE OR SCAB.—XI. LICE.—XII. DIARRHŒA.—XIII. LEPROSY.—XIV. SKELETON OF THE HOG.

I. Inflammatory Diseases.

Swine are, from their nature and the manner in which they are kept, more subject to congestive and inflammatory diseases than any other farm animal. The results of this tendency are conspicuously seen in quinsy, coughs and colds, sometimes ending in consumption, and especially in inflammation of the lungs.

II. Pneumonia, or Inflammation of the Lungs.

How to know it.—By the rapid and laborious breathing, and shivering of the body and limbs. There will be a more or less severe cough, and the hog loses appetite.

What to do.—Put the animal in a comfortable, quiet and well ventilated place. Keep a preparation of mustard and tepid water on the chest and side, and give the following mixture :

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|---------|--------------------------------|
| No. 13. | 2 Drachms bi-sulphate of soda, |
| | 2 Drachms nitrate of potash. |

Mix in a pint of gruel and feed it to the patient, or turn it down from a horn. This may be repeated as necessity requires, and, if necessary, a blister may be applied to the chest ; but good nursing, and such nourishing food as the hog will eat, should effect a cure.

III. Quinsy or Inflammation of the Tonsils.

This is a common and often fatal disease, if relief is not promptly given. It is an inflammation of the glands of the throat.

How to know it.—If you find that the hog has difficulty in swallowing ; if salivary and protrusion of the tongue are seen, and especially if there be a swelling under the lower jaw and neck, you may be sure the animal has the quinsy.

What to do.—Cast the hog or pig, and with a thin, keen-bladed knife scarify the parts until the blood flows freely. Then foment the parts

with cloths wrung out of very hot water, applying them repeatedly to induce bleeding and reduce the inflammation. In the mean time the following should be prepared, to be used as soon as possible, as an injection :

- | | |
|---------|--------------------------------|
| No. 14. | 4 Ounces sulphate of magnesia, |
| | 2 Drachms oil of turpentine, |
| | $\frac{1}{2}$ Pint soap suds. |

Mix, and inject into the rectum with a syringe. If the animal will eat, give the following, mixed in a little gruel :

- | | |
|---------|----------------------------|
| No. 15. | 2 Teaspoonfuls turpentine, |
| | 2 Teaspoonfuls lard oil. |

If he will not eat, swab the tonsils often with the mixture by means of a swab fastened to a small rod, the mouth being held open, as previously described.

IV. Apoplexy, Stagers or Congestion of the Brain.

This disease is not unusual in fat hogs.

How to know it.—The animal will be stupid ; the eyes red ; the pulse hard and rapid ; the bowels constipated. As the disease progresses, the animal becomes partially or wholly blind, going in a circle or striking against objects ; and at last he falls unconscious. Sometimes the attack is attended with effusion on the brain, without other symptoms being especially noticeable ; the animal falls suddenly ; the limbs stiffen ; froth flows from the mouth, and the breathing is hard, with a snorting sound.

What to do.—If cold water is not at hand, bleed freely from the jugular vein. The proper application is cold water allowed to fall upon the head from a considerable height. At the same time let an injection be quickly prepared and administered at once ; use No. 14.

V. Colds, or Rising of the Lights.

Rising of the lights is what is generally called a cold. Keep the animal warm and quiet ; feed well with easily digested food, and rub vinegar and mustard on the chest. If it does not yield to treatment, give a table-spoonful of tar every day, placing it well back on the tongue with a paddle. If the disease resolves itself into inflammation of the lungs, see treatment therefor in Article II, of this chapter.

VI. Catarrh or Snuffles.

This is a common disease that usually disappears with warmth and good care, and light, digestible food. It sometimes assumes a chronic form, as nasal gleet, just as it does in man. When this is the case, the animal had better be killed at once and buried.

VII. Measles and Trichina.

Causes.—In swine measles is caused by a parasite (the bladder worm) from eating the eggs of the tape worm of man (*tenia solium*) in its food, just as trichina is caused by eating rats and mice or garbage containing the germs of this parasite; dogs, also, are well known to carry and void the eggs of the tape-worm, and hence care should be taken that swine do not eat their excrement. If the flesh of measly pork is eaten by man, without its being most thoroughly cooked, he will be just as surely infected with tape-worm as he would be with trichina if he ate trichina-infected pork. Hence, it is never safe to eat measly pork, since there is always danger that some of the cysts may escape death in cooking.

The tape-worm is a flat-bodied worm, made up of small segments or joints from a quarter to a half inch in length, joined end to end, with a depression between them. When full grown, the worm is from one inch to one hundred feet long. One end is narrow, being the head, which is globular and furnished with circular, sucking discs and a proboscis or snout, encircled by a row of hooklets. From the broad end the segments become detached and are expelled when ripe. These little segments may be seen wriggling along over the grass, vegetables and ground, and, as they go, they deposit innumerable quantities of eggs, which are taken up by grazing animals, especially the hog. It is estimated that a single tape worm lays upwards of 25,000,000 eggs. An egg taken into the stomach of a hog opens and hatches an ovoid, six-hooked embryo, which bores its way through the tissues till it finds a tissue congenial to its nature; and there it encysts itself and lies an indefinite length of time till, perhaps, it is eaten by a person, who becomes a host for the tape-worm, which is developed **very** soon and causes intestinal pain, emaciation, nervous irritability, convulsions and, often, death.

HEAD OF *TENIA SOLIUM*.

Magnified, (Cobbold.)

The *cysticercus cellulosa* is the hydatid or bladder worm, that forms the measles in pigs; it becomes encysted in the muscles, liver, brain, mucous and serous membranes, etc.

How to know it.—Measly pork is known by the cysts, some of which are nearly the size of a grain of barley, distributed through the muscular and other tissues. In the living hog, when infected, there will be found small, watery pimples of a pink or red color, just under the skin. There will also be weakness of the hind parts and general lack of health.

*CYSTICERCUS CELLU-
LOSA*.—Magnified.

What to do.—Treatment is of little avail. If the difficulty could be known in time, daily small doses of sulphur and saltpetre, given for some weeks, might pass the eggs from the bowels; yet this is not certain. Keep the dogs about the place free from tape worms by occasional vermifuges, and burn all their dung when found.

VIII. *Trichina Spiralis*.

Trichinæ are found in all animals, but usually in man, the hog and the rat. They are almost microscopic, varying from one-eighteenth to one-sixth of an inch in length, and are among the most fatal of parasites.



ADULT INTESTINAL TRICHINA SPIRALIS.
MAGNIFIED.

The mature and fertile worm lives in the intestines of animals, while the immature lives in cysts in the muscles. When the eggs first hatch, the young ones migrate through the intestines, and find their way into the voluntary muscles, that is, the muscles of motion; and in the course of six weeks they become encysted, and do no farther harm to the man or animal containing them; but during those six weeks the life or death of the victim is merely a question of strength to withstand the pain, ex-

haustion and emaciation, and many people die from it.

How to know it.—The symptoms are swelling and great soreness of the muscles affected; pain; emaciation and exhaustion; it is often mis-



MUSCLE TRICHINA ENCYSTED. MAGNIFIED.

taken for rheumatism. In the lower animals, the same symptoms are seen as in man, but to a less marked degree; there is loss of appetite; stiffness in the hind parts; the muscles are sore, and the animal is loth to move. If those affected live

through the six weeks, they will recover.

What to do.—During the six weeks give alcohol in half-ounce doses, three times a day in gruel, and a teaspoonful of sulphur in the food morning and night.

Prevention.—For people—never eat underdone pork, for trichinæ survive 140° F. Hams thoroughly smoked and boiled are safe.

For hogs—keep them remote from slaughter houses, and never feed them on the offal from slaughter houses. Keep their pens free from rats and mice. Pork fed on slaughter refuse, or kept near a slaughter house, ought to be examined with a microscope before being eaten.

IX. Other Intestinal Parasites.

These are numerous. The lard worm (*Stephanurus Dentatus*) and the kidney worm (*Eustrongylus Gigas*) are the most common, except those which produce the measles. Once they have found lodgment, there is little to be done, and the swine had better be killed immediately and converted into grease to avoid danger. The lard worm is from one to one and three-fourths inches long, by one-thirteenth inch broad, and is found in almost all parts of the body. It is often found in the liver, and the fat about the rib, heart the air passages, etc.



STEPHANURUS
DENTATUS
OR LARD
WORM.

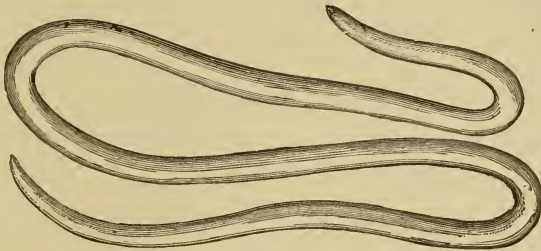
a, male; d, female;
c, head magnified
—(Verrill.)

The *Eustrongylus Gigas* is found in the kidneys, which it lives on till the whole is eaten, and then it attacks the capsule enclosing the kidney and eats its way through into the intestinal cavity, and causes death from nervous prostration or inflammation. The kidney worm grows to enormous size—the *gigas* means the giant—it being found from one to three feet long and from a quarter to a half inch in diameter. It is sometimes found in the intestines.

Worms in Hogs:—Worms in hogs are best treated, in ordinary cases, by giving a teaspoonful of copperas to each one once a day in the feed.

X. Parasites of the Skin—Mange or Scab.

Scab is produced by a small itch insect (*Sarcoptis Suis*), and the disease may be communicated to man. If the animals appear uneasy



EUSTRONGYLUS GIGAS (Cuvier.)

examine them with a glass. Mange should be no more tolerated than the itch in children.

What to do.—Give the animal, immediately, and thereafter once a day for a fortnight, the following as a dose:

No. 16.

$\frac{1}{2}$ Ounce flowers of sulphur,
1 Drachm nitrate of potash.

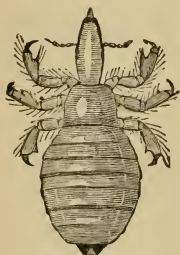
Mix as a powder, and give in the food. Rub the animal thoroughly with soft soap, and at the end of an hour clean well with warm rain water. When dry, prepare the following:

- | | |
|---------|--|
| No. 17. | 1 Pint train oil,
2 Drachms oil of tar,
1 Drachm petroleum,
Flowers of sulphur to form a thick paste. |
|---------|--|

Rub this thoroughly in, and let it remain three days. Then wash thoroughly with strong soap suds, and if the difficulty is not removed, repeat the application of the ointment. The animals must be changed to perfectly clean quarters, with clean bedding. Burn all old bedding, and paint the floor cracks, and every surface outside and in, with quick-lime, slaked with carbolic acid, one part to one hundred of water; or get the carbolic liquor from the nearest gas-works, and slake with that.

XI. Lice.

There would seem no reason why swine should be infested with lice.



HEMATOPINUS.

Blood-sucking louse of the pig.

If they be suspected, examine the hogs, and when dry, after washing with soft soap and water, sponge freely with crude petroleum, and give daily, for some days, $\frac{1}{4}$ drachm of copperas in the food. If any lice remain, apply an ointment of Scotch snuff and lard to the infested parts.

XII. Diarrhœa.

Young pigs are often taken with diarrhœa, generally during the first ten days after birth. The difficulty lies in the milk of the sow, either from bad food or other disability.

What to do.—Give good, nourishing food, of which sound grain is the basis; place a mixture of powdered charcoal and salt where the pigs and sow may freely take it. Prepare the following:

- | | |
|---------|--|
| No. 18. | 2 Pounds powdered fœnugreek seed,
2 Pounds powdered anise seed,
2 Pounds powdered chalk,
1 Pound powdered gentian,
2 Ounces carbonate of soda. |
|---------|--|

Mix, and give a tablespoonful to the sow every time she is fed.

XIII. Leprosy.

We have received accounts of hogs affected with "hog cholera"—every disease for which no better name is known is now so called—in which pimples and blisters appear about the mouth and eyes, prostration ensues

the animal staggers when moving, and death follows sometimes with great emaciation. In Europe this disease is called Leprocy—a misnomer as much as to call it “hog cholera.” It is a form of malignant eczema.

What to do.—Allow the hog a clean, cool, well ventilated place with cool water to drink, and, if possible, pure water for a bath. Cleanse the skin with soft soap and water, and dress the sores with the following lotion three times daily:

1 Ounce powdered borax,
1 Pint of soft water.

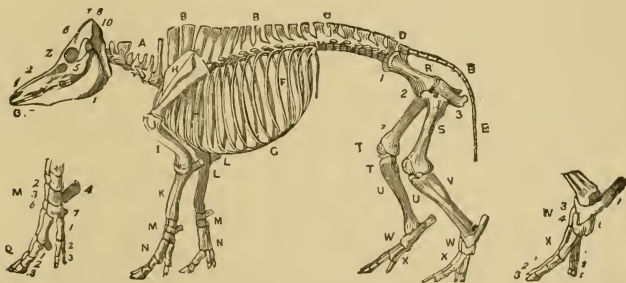
Give, twice a day, the following, in gruel or anything the animal will best eat:

No. 19. $\frac{1}{2}$ Ounce flowers of sulphur,
1 Drachm nitrate of potash.

The disease is contagious, and want of care, dirty pens, and foul feeding are superinducing causes.

XIV. Skeleton of the Hog.

For a better understanding of the anatomy of the hog, the lettered and figured illustration of the skeleton will be found instructive. The first series of figures, following the capitals, refer to the bones of the fetlock and feet. The figures following Phalanges 1, 2, 3, refer to the hinder parts. The last series of figures following Z—Head, indicate the bones of the head. The reader will have no difficulty in recognizing and learning the names.



SKELETON OF THE HOG.

Names of the Bones.—*A*—Cervical vertebrae. *B, B*—Dorsal vertebrae. *C*—Lumbar vertebrae. *D*—Sacrum. *E, E*—Coccygeal bones. *F, F*—Ribs. *G*—Costal cartilages. *H*—Scapula. *I*—Humerus. *K, K*—Radius. *L*—Ulna. *M*—Carpus, or knee. 1. Scaphoid. 2. Semilunar. 3. Cuneiform. 4. Trapezium. 5. Trapezoid. 6. Os magnum. 7. Unciform. 8. Pisiform. *N, N*—Large metacarpal, or

cannon. *O*—Small metacarpal. *P, P*—Sesamoid bones. *Q, Q*—Phalanges. 1. Os suffraginis, or pastern bone. 2. Os coronæ. 3. Os pedis. *R*—Pelvis. (Fore-leg of pig. Phalanges 1, 2, 3). 1. Ilium. 2. Pubis. 3. Ischium. *S*—Femur. *T*—Patella. *U*—Tibia. *V*—Fibula. *W*—Hock. 1. Os calcis. 2. Astragalus. 3. Cuneiform magnum. 4. Cuneiform medium. 5. Cuneiform parvum. 6. Cuboid. 3, 6. Cubo cuneiform. *X*—Large metatarsal. (Hind-leg of pig. Phalanges 1, 2, 3). *Y*—Small metatarsal. *Z*—Head. 1. Inferior maxilla. 2. Superior maxilla. 3. Anterior maxilla. 4. Nasal bone. 5. Molar. 6. Frontal. 7. Parietal. 8. Occipital. 9. Lachrymal. 10. Squamous-tempoid. 11. Petrous-tempoid.

Delivering Pigs—If conditions are right there should be little occasion for trouble in this regard. The sow should not be too fat and from twelve to thirteen months old. She should have plenty of room to exercise—a run to clover, alfalfa or other grass is excellent and give a little extra laxative food for two or three weeks before farrowing if she is the least bit constipated. Do not ring a brood sow.

With all this care, trouble should yet occur, proceed quietly with a pair of forceps or a wire hook to assist in the delivery, taking care that the instruments as well as your hands are well oiled and that you do not use undue violence in the work.

To Castrate a Ruptured Pig—Elevate behind and work the intestine back. Make an incision at the usual place but do not cut through the covering next to the testicle. Tie the cord and its covering with a strong linen thread as close to the body as possible, taking care that the intestine is not caught, and sever within an inch of tie.

Tumor On the Cord—This is an evil result of castration. The tumor usually grows rapidly and attains great size. Peel it out and disinfect with carbolic acid and water. A few stitches may be taken leaving a drainage at the bottom.

Milk Fever in Sows—It occurs at time of delivery and is serious in that milk is not secreted and the sow is very sick.

Drench her with about a quarter of a pound of epsom salts, a tablespoonful of sweet sp. of nitre and a little ginger. Follow this with a mixture of saltpeter and sulphur, using a teaspoonful for a dose once or twice a day. Let the pigs tug at the teats and bathe with hot water.

Spaying Sows—Right time, four to eight weeks old. Lay the pig on its right side with hind legs stretched back. Remove hair from a spot midway between hip joint and edge of flank and make a cut one inch long and through the muscle. Insert a finger and make an opening in membrane covering fat. Press intestines forward and bring out upper ovary with points of fingers. Work out folds of the bag to the fork, then the other ovary in same way. Cut off the bag at or near the fork. Insert a finger and push back the intestine and let the left leg loose. Withdraw finger, disinfect wound and take a couple of stitches with coarse cotton thread.

To Castrate a Ridgling—Make the incision as for spaying, only large enough to insert the hand when the testicle may be found and easily pulled out and severed. Disinfect and sew up the wound.



CERVERO, THE LARGEST SPANISH MERINO IN THE WORLD, AND FOUR OF HIS LAMBS.
At Two Years Old Sheared Fifty-Two Pounds Wool.—Specially photographed for this work.

BOOK IV

PART I

Sheep and Sheep Husbandry

EMBRACING

ORIGIN, BREEDS, BREEDING AND MANAGEMENT;

WITH FACTS CONCERNING GOATS



DORSET SHEEP.
Specially photographed for this work.

SHEEP AND SHEEP HUSBANDRY.

CHAPTER I.

ORIGIN, ANATOMY AND POINTS.

I. NATIVE COUNTRY OF SHEEP.—II. THEIR DIVERSIFIED CHARACTER.—III. ANATOMY OF THE SHEEP.—IV. TOP AND VERTICAL VIEWS OF SKULL.—V. DENTITION OF SHEEP.—VI. POINTS OF SHEEP EXPLAINED.—VII. DIVISIONS OF FINE WOOL.—VIII. COMPARATIVE VALUE OF FINE AND COARSE WOOL.—IX. RANGING AND FLOCKING OF DIFFERENT BREEDS.—X. REGIONS ADAPTED TO SHEEP.—XI. POINTS OF EXCELLENCE OF THE PRINCIPAL BREEDS.—XII. STANDARD FOR AMERICAN MERINOS.—XIII. STANDARD FOR MIDDLE-WOOLED SHEEP.—XIV. STANDARD FOR COTSWOLD SHEEP.

I. Native Country of Sheep.

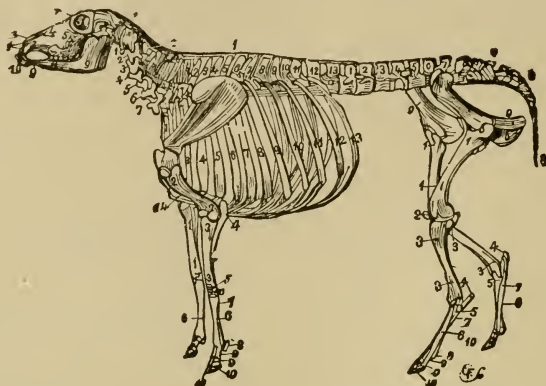
The native country of sheep is not known, and has not been since the earliest historical times. There are no wild sheep known, if we except the *Ovis Montana*, or wild sheep of Montana, in the United States, though at the Paris exhibition of 1865, several wild (so-called) sheep were exhibited, although bred in confinement. Among these were the wild sheep of Barbary, *Ovis Tragelapus*, more resembling a goat than our wild species, which is really a sheep; and also the Punjaub wild sheep, *Ovis Cycloceras*, a native of Northern India, and the European moufflon, *Ovis Musimon*, belonging to Corsica and Sardinia.

II. Their Diversified Character.

That sheep were the earliest domesticated of any of the wild animals, there is no doubt. Abel was a keeper of sheep, the first recorded shepherd or herdsman of any kind. The great length of time since their domestication, is also shown by their widely diversified character. The classification of Jinnæus shows: The Hornless, Horned, Black-faced, Spanish, Many horned, African, Guinea, Broad-tailed, Fat-rumped, Bucharian, Long-tailed, Cap-bearded, and Bovant. To these may be added the Siberian sheep of Asia, found also in Corsica and Barbary, and

the Cretan sheep of the Grecian Islands, Hungary, and some portions of Austria, making about all the principal sub-species.

III. Anatomy of the Sheep.



SKELETON OF LEICESTER SHEEP.

Explanation.—Beginning with the head, the references to cut of skeleton show: 1—The intermaxillary bone. 2—The nasal bones. 3—The upper jaw. 4—The union of the nasal and upper jaw bone. 5—The union of the molar and lachrymal bones. 6—The orbits of the eye. 7—The frontal bone. 9—The lower jaw. 10—The incisor teeth or nippers. 11—The molars or grinders.

The Neck and Body.—1, 1—The ligament of the neck, supporting the head. 1, 2, 3, 4, 5, 6, 7—The seven vertebræ, or bones of the neck. 1—13—The thirteen vertebræ, or bones of the back. 1—6—The six vertebræ of the loins. 7—The sacral bone. 8—The bones of the tail, varying in different breeds from twelve to twenty-one. 9—The haunch and pelvis. 1—8—The eight true ribs with their cartilages. 9—13—The five false ribs, or those that are not attached to the breast bone. 14—The breast bone.

The Fore Leg.—1—The scapula or shoulder-blade. 2—The humerus, bone of the arm, or lower part of the shoulder. 3—The radius, or bone of the forearm. 4—The ulna, or elbow. 5—The knee, with its different bones. 6—The metacarpal or shank-bones; the larger bones of the leg. 7—A rudiment of the smaller metacarpal. 8—One of the sessamoid bones. 9—The two first bones of the foot; the pastern. 10—The proper bones of the foot.

The Hind Leg.—1—The thigh bone. 2—The stifle joint and its bone, the patella. 3—The tibia, or bone of the upper part of the leg. 4—The point of the hock. 5—The other bones of the hock. 6—The metatarsal bone, or bone of the hind leg. 7—Rudiment of the small metatarsal. 8—A sesamoid bone. 9—The two first bones of the foot, the pasterns. 10—The proper bone of the foot.

It will be seen that the general anatomy of the sheep corresponds to that of the ox. In the limbs we find the number of joints the same in the horse, ox and sheep. Beneath the fetlock, however, the four bones are doubled in the sheep.

IV. Top and Vertical Views of Skull.

The first illustration shows the skull of a polled sheep as seen from the top.

Explanation.—1—Occipital bone, depressed out of danger. 2—The parietal bones, the suture having disappeared, and also out of danger. 3—The squamous portions of the temporal bone—the buttress of the arch of the skull. 4—The meatus auditorius, or bony opening into the ear. 5—The frontal bones. 6—The openings through which blood-vessels pass, to supply the forehead. 7—The bony orbits of the eye. 8—The zygomatic or molar bones, very much developed. 9, 10—The bones of the nose. 11—The upper jaw bone. 12—The foramen, through which the nerve and blood-vessels pass, to supply the lower part of the face. 13—The nasal processes of the intermaxillary bones. 14—The palatine processes. 15—The intermaxillary bone, supporting the cartilaginous pad, instead of containing teeth.



SKULL OF A POLLED SHEEP.

11—The upper jaw bone. 12—The foramen, through which the nerve and blood-vessels pass, to supply the lower part of the face. 13—The nasal processes of the intermaxillary bones. 14—The palatine processes. 15—The intermaxillary bone, supporting the cartilaginous pad, instead of containing teeth.

Next we give a vertical section of the head with its appropriate explanation.

Explanation.—1—Nasal bone. 2—Upper jaw bone. 3—Intermaxillary bone supporting the pad, supplies the place of upper front teeth. 4, 4—The frontal sinus. 5—Cavity or sinus of the horn, communicating with the frontal sinus. It is here shown by removal of a section of the base of the horn. 7—The frontal bone. 8—Vertical section of the brain. 9—Vertical section of the cerebellum. *a*—The cineritious portion of the brain. *b*—The medullary portion of the brain. 10—The ethmoid bone. 11—The cribiform



HEAD OF SHEEP—VERTICAL SECTION.

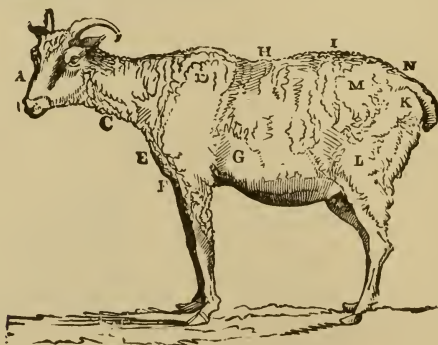
or perforated plate of the ethmoid bone. 12—The lower cell of the ethmoid bone. 13—The superior turbinated bone. 14—The inferior turbinated bone. 17—The sphenoid bone.

V. Dentition of Sheep.

Youatt gives as follows the dentition of sheep, by which it will be easy to tell the age correctly: The sheep has eight incisors in the lower jaw, and twelve grinders—six on a side in each jaw,—making in all thirty-two teeth. At birth the lamb should have the two central incisors just pushing through. At a month old all the incisors should be up. At one year, sometimes not until fifteen months old, the two first milk incisors will be shed, and two new or permanent ones will appear. At two years old past, it will have two more permanent teeth, or four in all. At three years old past, it will have six permanent incisors, and at four years old past, the eight permanent teeth, or a full mouth, as it is called, will be shown. This will be an accurate test as to the age of sheep, up to four years, varied of course, by care and keep; highly fed sheep developing faster than ill kept ones. At six the incisors begin to decrease in breadth, and lose their fan shape, as seen at four years old. At seven they become longer and narrower, and each year this shrinkage continues, until at last they become quite slender, the middle ones long, and at ten years they loosen and begin to drop out.

VI. Points of Sheep Explained.

To locate the different exterior portions of the sheep, we give a cut of one of the half-wild breeds of the animal, which seems goat-like, but the wool of which shows it to be a sheep.

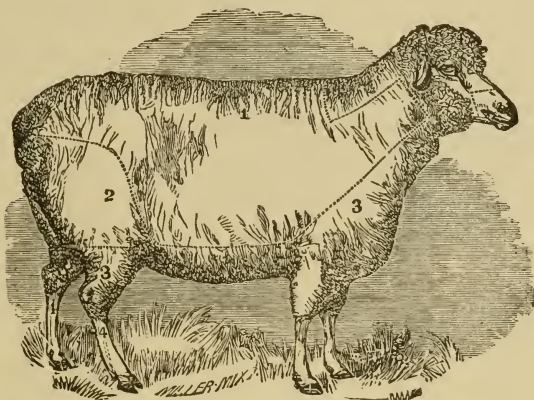


EXTERIOR POINTS OF SHEEP.

Explanation.—A—Face. B—Muzzle. C—Neck. D—Shoulder. E—Shoulder. F—Breast. G—Girth-place. H—Back. I—Back. J—Back. K—Back. L—Back. M—Hind. N—Root of Tail.

VII. Divisions of Fine Wool.

To illustrate the divisions of the wool we give a figured cut of a fine woolled sheep. The divisions are numbered to correspond to pure Saxon and Merino sheep, which when pure-bred, show only four qualities of wool. However, the cross-breds and especially grades sometimes show seven or eight.



DIVISION OF WOOL.

Explanation.—The *refina*, or pick wool, (1) begins at the withers, and extends along the back, to the setting on of the tail. It reaches only a little way down on the quarters, but dipping down at the flanks, takes in all the superior part of the chest, and the middle of the side of the neck to the angle of the lower jaw. The *ina*, (2) a valuable wool, but not so deeply secreted, or possessing so many curves as the *refina*, occupies the belly, and the quarters and thighs, down to the stifle joint; (3) is found on the head, the throat, the lower part of the neck, and the shoulders, terminating at the elbow, (fore legs,) and reaching from the stifle to a little below the hock; (4) is procured from the tuft that grows on the forehead and cheeks, from the tail, and from the legs below the hock.

VIII. Comparative Value of Fine and Coarse Wool.

Up to twenty years ago, fine wool was the most valuable, and the fineness of the fiber increased the price per pound in corresponding ratio. Then the exceeding fineness of broadcloth was the limit and standard of highest excellence. Of late years the demand for long and worsted wools

has steadily increased, with the change in fashion for gentlemen's wear; and the demand for worsted, combing, and other long wools is steadily growing, and at prices altogether in advance of the fine wools. Hence the larger breeds of sheep, once principally valuable for their mutton, sprung suddenly into favor for their wool. In England, the value of a sheep is rated fully as much for the carcass as for the wool. In the United States and in Canada, to a considerable degree, the wool is still the principal object; so the saying that, an Englishman in examining a flock, would ask, "how much will they dress," while the question of an American would be, "how much will they shear," still holds good.

Nevertheless, this is gradually changing; and the increased consumption of prime mutton in our large cities, and the increased facilities for ocean transportation of live animals, have stimulated more and more the breeding of mutton sheep. The probability is, that the fashionable fabrics made of the wools mentioned will not soon go out of use for summer wear, since they are altogether superior to cotton and linen, both in coolness and the ease with which they may be kept clean.

Fine wools, on the other hand, will never be superseded for winter wear, for blankets, for underclothing, and the endless variety of uses for which they are adapted.

IX. Ranging and Flocking of Different Breeds.

It is not generally known that there are peculiarities in sheep husbandry, especially in the flocking of herds, which cannot be overcome. The most important of these is, that the mutton and long-wooled breeds cannot be carried in large flocks. Merino and other fine-wooled breeds may easily be carried in flocks of even 1000 and upwards, on suitable soils; but the large breeds cannot successfully be carried in flocks of more than 200 together. Hence the adaptability of the Western plains and of Texas and New Mexico to the fine-wooled breeds, individual owners numbering their flocks by many thousands each. On the other hand, the large breeds are the favorites among farmers in the thickly settled portions of the United States, where they are kept in flocks of from twenty up to several hundreds.

X. Regions Adapted to Sheep.

It has generally been thought that only rocky, hilly regions are well adapted to the keeping of sheep. This is a mistake. Such regions are suited to sheep, no doubt, for sheep require a firm soil; sheep, also, can subsist in rocky, barren regions where other animals would starve. Yet any dry situation adapted to grass possesses all the necessary essentials. The Western prairies, which, except for a short time in the spring, are firm and dry, are most admirably adapted to sheep. All the hill



GROUP OF RAMBOUILLET RAMS.
Specially photographed for this work.



CHEV'N WETHER SHEEP.



DORSETS.
Noted Prize Winners.—Specially photographed for this work.

regions of the South are eminently suited for sheep husbandry, especially for the mutton and long-wooled breeds. There are found the essentials of a genial climate, plenty of range, pure water, sweet grasses, and a soil natural to sheep. There is only a single drawback—the number of dogs that are allowed to wander at will to decimate flocks. If the dogs were abated, the hill regions of the South would soon prove as valuable for sheep as for fruit and for general agriculture.

XI. Points of Excellence of the Principal Breeds.

The standards of excellence, now generally adopted at the St. Louis fair, at the Illinois State fair, and at many other prominent Western fairs, and also at the great exhibition of live stock at the Chicago fair for 1881, may be taken as being as near perfect as possible, and will rule in all points except, perhaps, in the weight of the carcass. In the East, and in some portions of the hill region South, the weight of carcass may be reduced some twenty pounds. Thus the standard of 165 pounds gross weight for a Merino ram, and 120 pounds for gross weight of Merino ewe, was reduced to 140 and 100 pounds respectively at the Centennial Exhibition, while in other respects the standards were identical. At St. Louis, the heavy standard known as the Illinois standard is, without modification, used for judging sheep. This standard, in fact, was really arranged by prominent breeders of Illinois, and of the country contiguous to St. Louis, we believe. The standards for the several grades will be found adapted to any breed; that for Cotswolds, applying to any long-wooled breed with very simple modifications. The standards are as follows:

XII. Standard for American Merinos.

	POINTS.
BLOOD. —Thoroughbred, <i>i. e.</i> , purely bred from one or more of the direct importations of Merino sheep from Spain prior to the year 1812, without the admixture of any other blood. - -	1
CONSTITUTION. —Indicated by form of body; deep and large breast cavity; broad back, heavy quarters, with muscular development forming capacious abdomen; skin thick, but soft, of fine texture, and pink color; expansive nostril, brilliant eyes, healthful countenance, and good size, age considered. - - - -	15
SIZE. —In fair condition, with fleece of twelve months' growth, full-grown rams should weigh not less than 165 pounds, and ewes not less than 120 pounds. - - - -	7
GENERAL APPEARANCE. —Good carriage, bold style, elastic movement, showing in particular parts, as well as general outline and symmetry of form. - - - -	3

POINTS.

- BODY.**—Throughout, heavy bones, well proportioned in length; smooth joints; ribs starting horizontally from back-bone, and well rounded to the breast-bone, which should be wide, strong, and prominent in front; strong back-bone, straight and well proportioned as to length; heavy, muscular quarters, deep through, and squarely formed behind and before, with shoulders well set on, neither projecting sharply above the back-bone, nor standing so wide and flat as to incur liability to slip-shoulders. - 8
- FOLDS AND WRINKLES.**—Folds on the ram should be larger than on the ewe. Large and pendulous folds from the chin or jaws, succeeding each other down the neck to the brisket, ending with large fold or “apron,” and extending up the sides of the neck, but lighter if at all extending over top of neck; two or three behind the fore leg or shoulder; one on front of hind leg, hanging well down across the flank; two or more on rear of hind legs or quarters, extending up towards the tail, with one or two on and around the tail, giving the animal a square appearance on the hind quarters, and straight down as may be from end of tail to hock joints and hind feet. In addition to folds, small wrinkles over the body and belly are desirable, as forming compactness of fleece, but not large enough to be apparent on the surface of grown fleece, or to cause a jar in its quality, thus leaving the body of the fleece even in quality, and free from the jar of large folds over the body. - - - - - 10
- HEAD.**—Wide between the eyes and behind the ears and across the nose; short from top of head to tip of nose; face straight, eyes clear and prominent; ears thick, medium size, and, together with the face, nose and lips, white, covered with soft fur or downy wool. Ewes should give no appearance of horns, while upon the rams the horns should be clear in color, symmetrically curved, without tendency to press upon the sides of the head or to extreme expansion. - - - - - 6
- NECK.**—Medium length, good bone and muscular development, and, especially with the rams, heavier, toward the shoulders, well set high up, and rising from that point to the back of the head. - - - - - 5
- LEGS AND FEET.**—Legs medium or short in length, straight and set well apart forward and back; heavy bone, smooth joints, with large muscular development of the fore-arm; thick, heavy thighs, wide down to hock joints, and from knee joints downward covered with short wool, or the soft furry covering peculiar to the ears and face; hoofs well shaped and of clear color. - 5

POINTS.

COVERING .—Tendency to hair and gare upon any part of the sheep is to be avoided. Evenness of fleece in length, quality, density, lustre, crimp, trueness, strength and elasticity, covering the entire body, belly and legs to the knees; head well covered forward, squarely to a line in front of the eyes; well filled between the eyes and the ears or horns, and well up on the cheeks; muzzle clear, with small opening up to and around the eyes. Scrotum of rams covered with wool, free from tendency to hair.	1½
QUALITY .—Medium, but such as is known in our markets as fine delaine and fine clothing wool, distinctly better in quality, lustre, crimp and elasticity, than the wools of same length grown upon the common grade sheep.	5
DENSITY .—Shown by the compactness of the fleece throughout, which should open free but close, showing very little of the skin at any point, even at the extremities of the fleece.	10
LENGTH .—At one year's growth not less than two and one-half inches, and as nearly as may be uniform in length to the extremity of the fleece.	5
OIL .—Evenly distributed; soft and flowing freely from skin to surface; medium in quantity.	5

100

XIII. Standard for Middle-Wooled Sheep.

POINTS

BLOOD .—Purely bred from one or more of direct importations from Great Britain.	10
CONSTITUTION AND QUALITY .—Indicated by the form of body; deep and large in breast and through the heart; back wide, straight, and well covered with lean meat or muscle; wide and full in thigh, deep in flank; skin soft and pink color; prominent eyes and healthful countenance.	25
SIZE .—In fair condition, when fully matured; rams should weigh not less than 200 pounds, and ewes not less than 175 pounds.	10
GENERAL APPEARANCE AND CHARACTER .—Good carriage; head well up; elastic movement, showing symmetry of form and uniformity of character throughout.	10
BODY .—Well proportioned; small bones; great scale and length; well finished hind quarters; thick back and loins; standing with legs well placed outside; breast wide, and prominent in front	10

	POINTS.
HEAD.—Short and broad; wide between ears, and well covered with wool; color dark grey; light muzzle not objectionable; ears short. - - - - -	10
NECK.—Short and heavy, especially toward shoulders. - - -	5
LEGS AND FEET.—Short and well set apart; color dark grey, and woolled to the hoof, which must be well shaped. - - -	5
COVERING.—Body, belly, head and legs well covered with fleece of even length and quality; serotum of rams also well covered. - - - - -	10
QUALITY OF WOOL.—Medium, such as is known in market as half-combing wool. - - - - -	5
	100

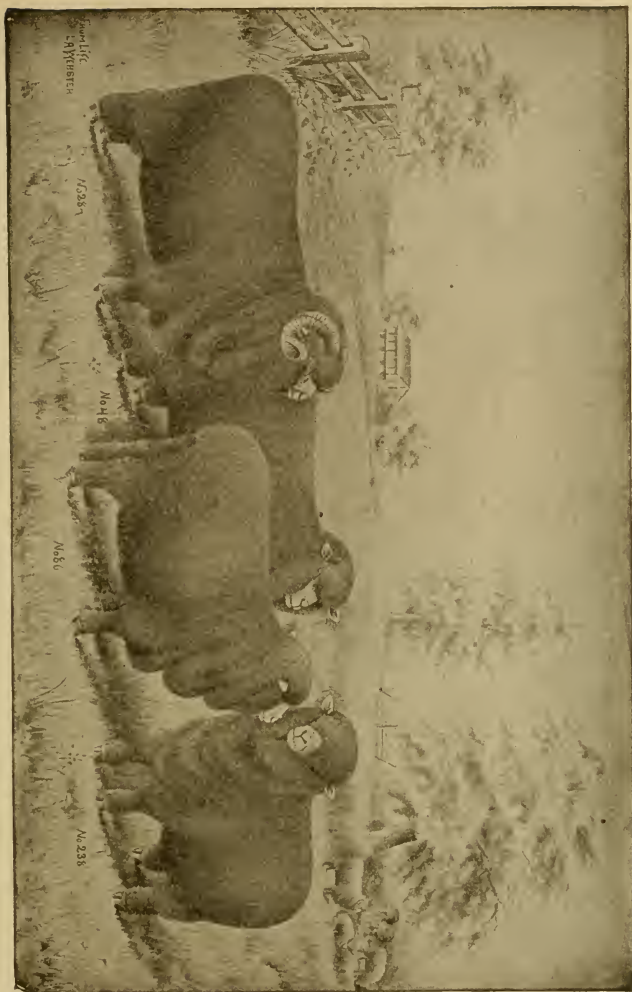
XIV. Standard for Cotswold Sheep.

	POINTS.
HEAD.—Not too fine, moderately small, and broad between the eyes and nostrils, but without a short, thick appearance, and in young animals covered on crown with long lustrous wool. - - -	8
FACE.—Either white or slightly mixed with grey, or white dappled with brown. - - - - -	4
NOSTRILS.—Wide and expanded; nose dark. - - - - -	1
EYES.—Prominent, but mild looking. - - - - -	2
EARS.—Broad, long, moderately thin, and covered with short hair	4
COLLAR.—Full from breast and shoulders, tapering gradually all the way to where the head and neck join. The neck of ram should be short, thick and strong, indicating constitutional vigor, (neck of ewe should be fine and graceful) and free from coarse and loose skin. [Collar 5 points with ewe.] - - -	6
SHOULDERS.—Broad and full, and at the same time join so gracefully to the collar forward and the chine backward as not to leave the least hollow in either place. - - - - -	8
FORE-LEGS.—The mutton on the arm or fore-thigh should come quite to the knee. Leg upright with heavy bone, being clear from superfluous skin, with wool to fetlock, and may be mixed with grey. - - - - -	4
BREAST.—Broad and well forward, keeping the legs wide apart; girth or chest full and deep. - - - - -	10
FORE FLANK.—Quite full, not showing hollow behind the shoulder. [4 points with ewe.] - - - - -	5
BACK AND LOIN.—Broad, flat and straight, from which the ribs must spring with a fine circular arch. - - - - -	12
BELLY.—Straight on underline. [5 points with ewe.] - - -	3



LEICESTERS.
Noted Prize Winners and Typical of Their Breed.—Specially photographed for this work.

GROUP OF MERINOS



QUARTERS.—Long and full, with mutton quite down to the hock.	POINTS.
HOCK.—Should stand neither in nor out.	8
TWIST.—Or junction inside the thighs, deep, wide and full, which, with a broad breast, will keep the legs open and upright. .	2
FLEECE.—The whole body should be covered with long, lustrous wool.	5
	18

CHAPTER II.

VARIETIES OF SHEEP AND THEIR CHARACTERISTICS.

- I. LONG-WOOLED ENGLISH SHEEP.—II. LINCOLN SHEEP.—III. ROMNEY MARSH SHEEP.—IV. LEICESTER SHEEP.—V. THE COTSWOLDS.—VI. NEW OXFORD-SHIRE SHEEP.—VII. THE OXFORD-DOWNS.—VIII. MIDDLE AND SHORT-WOOLED BRITISH BREEDS.—IX. WHITE-FACED MOUNTAIN SHEEP.—X. BLACK FACED HIGHLAND, OR SCOTCH SHEEP.—XI. HAMPSHIRE-DOWNS.—XII. SHROPSHIRE-DOWNS.—XIII. SOUTH-DOWNS.—XIV. OTHER BREEDS OF GREAT BRITAIN.—XV. DORSET SHEEP.—XVI. FINE-WOOLED SHEEP.—XVII. AMERICAN MERINOS.—XVIII. THE ATWOOD AND HAMMOND MERINOS.—XIX. THE RICH MERINOS.—XX. ABOUT SHEEP IN GENERAL.—XXI. THE AVERAGE WOOL PER SHEEP.—XXII. SUMMARY OF BRITISH BREEDS.—XXIII. THE SHEEP IN AUSTRALIA.—XXIV. THE WOOL HARVEST.—XXV. WHERE THE WORLD'S SHEEP ARE LOCATED.—XXVI. THE WORLD'S GREATEST WOOL SUPPLY.

Long-Wooled English Sheep.

Long-wooled sheep may be divided into two classes—those reared in rich alluvial and marshy districts that have been drained, as the Lincoln and Romney marshes: and those reared in the rich agricultural districts of arable land devoted to mixed farming. The latter includes the Cotswolds, the Leicesters, and the Oxford-Downs. In discussing long-wooled sheep, we shall simply give characteristics, supplemented with accurate illustrations of the more valuable breeds, since this will be all that will be necessary to enable the reader to easily recognise them and estimate their value.

II. Lincoln Sheep.

The Lincoln sheep are the largest sheep known. Under fairly good feeding they dress up to 120 to 160 pounds at two years old past, while under exceptional circumstances they dress up to 90 pounds per quarter at that age. Their long, lustrous fleeces, at the second shearing, will weigh from 10 to 15 pounds of washed wool, the fibre measuring nine inches in length. They have been known in the United States since 1835, are hardy and prolific, but large feeders. Notwithstanding their good qualities, they have not become widely disseminated in this country, the Cotswolds being generally preferred. They require the best and most succulent grasses and the most skillful care, and this, probably, is the reason why they have not succeeded so well in the West, where high farming is not the rule.

III. Romney Marsh Sheep.

These sheep are natives of the Southeastern part of England, especially the drained marsh districts of Kent, where they have been bred from the

earliest times. They are hardier than the Lincolns, and, like most British breeds of long-wooled sheep, have been improved by a cross of the Leicester. They have a peculiar tuft of wool on the forehead; a thick, broad head and neck; are long in the body, with flat sides; a broad loin; full, broad thighs; the fore quarters are not so well developed. The limbs are strong; the hoofs broad; the wool long, somewhat coarse, but sound, bright and glossy. The wethers at three years old will dress from 100 to 120 pounds for the butcher; the ewes dress from 70 to 90 pounds, and have much inside fat. There seems to be no reason why they should not prove valuable on rich, succulent pastures in the West, though it is not to be denied that all the English breeds deteriorate in America, especially in the West, probably both from the dry climate and the want of succulent food (roots) in winter.

IV. Leicester Sheep.

Leicester sheep are considered as among the most valuable of British breeds, and justly so. Since their improvement by Bakewell, during the last century, they have been successfully used for the general improvement of the long-wooled breeds of England, giving better feeding quali-



GROUP OF SHROPSHIRE RAMS.

ties, fineness and early maturity. They are divided into Leicesters proper and Border Leicesters. The modern improved Leicester is hornless; the head small and clean; eyes bright, prominent and animated; limbs clean and fine-boned; the neck and shoulders full and deep; the body full; back straight, with hind quarters tapering to the tail, and less square than

the Cotswolds; the flesh is good, but not the best, being too fat; the ears thin, long and directed back. The fleeces are especially valuable



GROUP OF BERDES LEICESTERS.

for combing wool, being white, long and lustrous, and will average seven or eight pounds per fleece; the skin is thin, but soft and elastic. They

fatten to weigh, at twelve months old past, up to twenty-five pounds each quarter, and at two years old up to about forty pounds per quarter. The breed is popular in some parts of the United States, especially in the West, but to succeed they must have the very best of care and attention.

Border Leicesters.—The breeding of the New Leicesters, or Dishley as they were sometimes called, upon the “Border Sheep” of England, produced what became known as the Border Leicester, a sub-family that attained a distinct and well marked position in England, and which, under good management, at about one year and a half old, would dress from eighteen to twenty pounds per quarter of tender and succulent flesh. Older than this the accumulation of fat was great, and the meat not fine. The principal characteristics are an exceedingly small head, and small but fine bone in proportion to the weight of carcass. They have clean jaws; thin ears; full, placid eyes; straight, broad, flat back; arched ribs—a peculiarity of all Leicesters, giving the body often the appearance, when fully clothed with wool, of being broader than it is deep. The belly is, also, carried very evenly below, giving a straight or nearly straight line below. The skin is thin, but mellow, and the fleece long and soft, averaging nearly as much as the improved Leicester—six to seven pounds. Their heavy accumulation of fat has not made them favorites in the United States.

V. The Cotswolds.

There are none of the English breeds of sheep that have become so universally disseminated in the United States—not excepting the South-Downs—as have the Cotswolds. The improved Cotswold is one of the largest of English breeds, even since its refinement through the Leicester crosses. It is hardy and moderately early in maturing; strong in constitution; broad-chested; round-barreled; straight-backed; and fattens kindly at thirteen to fifteen months old to yield fifteen pounds of mutton per quarter, and at two years old, from twenty to thirty pounds per quarter. The wool of the Cotswold is strong and rather coarse, but white and mellow, six to eight inches in length, and averaging seven to eight pounds per fleece; some American fleeces have been sheared weighing eighteen pounds. The two illustrations of Cotswold ewes will show the appearance of this favorite long-wooled breed as they appear under good keeping, before shearing time.

Cotswolds in the West and South.—Their many good qualities, especially their hardiness, adaptation to the rolling prairies of the West and the hill regions of the South, have made them general favorites with long-wool breeders. They also cross kindly with other breeds, including the South-Downs; the ewes are prolific, and the flesh of the lambs and

yearlings most excellent. Like all the long-wooled breeds, they accumulate much fat with age. Another point in their favor is that the fleeces are not gummy, and do not shrink, as do the Merinos. A pound of Cotswold wool, as it is taken from the sheep, will produce as much clean scoured wool as two and a half pounds of gummy Merino wool. South

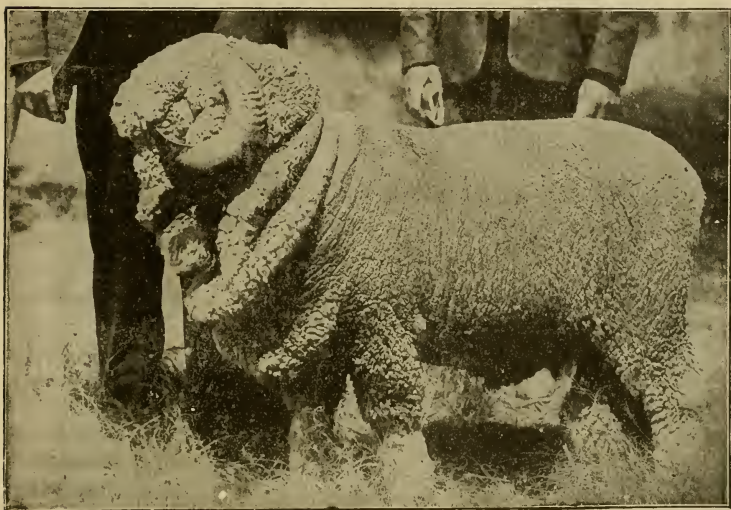


FIRST PRIZE BEST BRED O. R. C. RAM.
Special and Champion Prize for best South African Ram. The property of I. M. S. van Rooyen, Esq., Winburg, O. R. C.—Specially photographed for this work.

of the Ohio river, Cotswolds are often reported as wintering with little or no feeding, except grazing, unless during more than ordinarily severe winters. East and West of the Mississippi, in the latitude of St. Louis and south of it, the same is true, and the statement will hold good with all the more hardy breeds. Yet, even in these genial climates, all sheep must be sheltered from storms, and it is by no means good policy

to allow them to shift entirely for themselves in the matter of food. To show accurately the form of this admirable breed, we give an illustration of an ewe, and also of a buck, showing their appearance after shearing.

In the hill region of Virginia, and other parts of the South and West, the Cotswolds are yearly increasing in favor. The testimony of many Southern planters and farmers is decidedly in their favor. One statement, that of a prominent farmer of Clark county, Va., must suffice. His testimony is as follows: It is far more profitable to keep the different varieties of mutton breeds, than the fine wools, or Merino breed in this

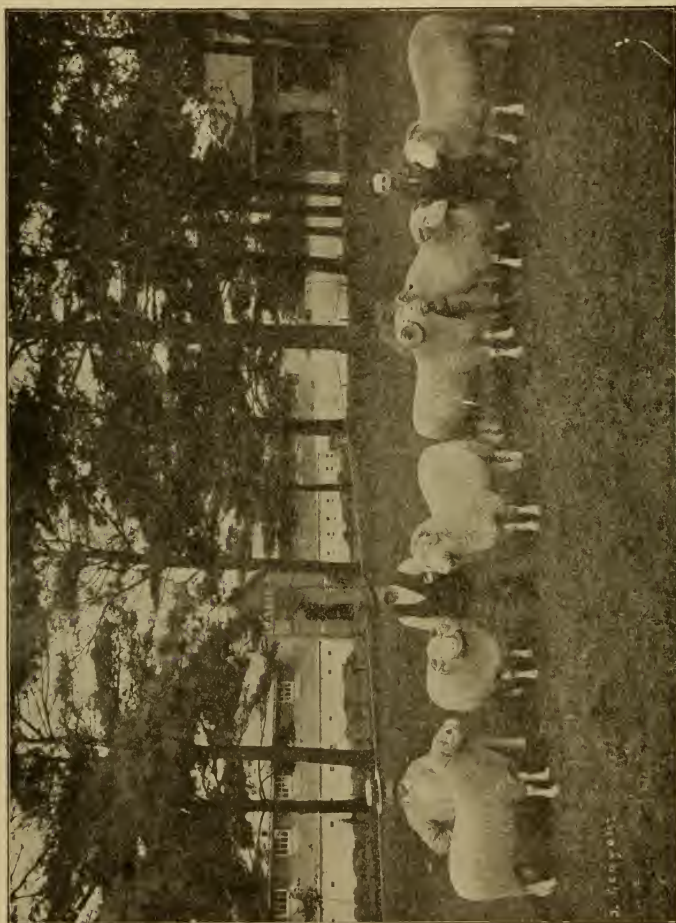


BEST IMPORTED RAM (German). Age 2 Years.

The property of J. C. van Rooyen, Esq., Bornman's Drift.—Photographed expressly for this work.

portion of Virginia. I say this from my own experience, and that of many intelligent gentlemen with whom I have conversed. The Cotswold sheep, and its crosses with the South-Down, are less liable to diseases of all kinds; they are more prolific, better nurses, and less liable to lose their lambs than the Merino. The lambs are more vigorous and hardy; then add their early maturity, their fitness for market at eighteen months old, and their almost double value when in market, and you have advantages which far outweigh the additional amount of food which the mutton sheep may consume in proportion to his size.

This is high praise not only for the Cotswolds, but for the South-Downs, which were always a favorite breed in the hill region of the South. It must be remembered, however, that none of the long-wooled or



GROUP OF DORSET HORN SHEEP.

the mutton breeds do well in large flocks. As before stated, 100 of these sheep is the largest number that should be flocked together. The illustration of yearling Cotswold will serve as a good representation of the

fully woolled animal at this age. It also shows the foretop of wool on the pate, which is characteristic of this breed.

GROUP OF OXFORD DOWNS.



VI. New Oxfordshire Sheep.

Another breed that has been introduced into the United States, but has not met with general favor, is the New Oxfordshire, one of the breeds arising from crosses of the New Leicester upon the Cotswold. They should not be confounded with the Oxford-Down, which is a cross between

the Cotswold and Hampshire-Down, and belongs to the middle-wools, as well as to the special mutton breeds. In England they are regarded in their own locality with favor. They are less hardy than the Cotswolds, and in the United States have not been received with special favor. The illustration of New-Oxfordshire ewe will show the general appearance of the breed.

VII. The Oxford-Downs.

This excellent breed of English sheep is said to have originated about the year 1830, by crossing a Cotswold ram on a Hampshire-Down ewe, producing a sheep heavier than the Hampshire, resembling the Cotswold in size and fleece, but finer and firmer in the fibre. The produce of these parents were bred together, and careful selection produced sheep that in



CHEVIOT.

1862 were awarded a separate class at the English fairs. They are comparatively rare in the United States. It is said of them that, in a district at the foot of the Cotswold hills, abounding in springy places, and requiring extensive drainage, they have succeeded and thriven where neither the Cotswolds nor the South-Downs would. A pen of these sheep, shown at the Smithfield cattle show, in 1873, are reported to have averaged, at 22 months old, 298 pounds each, or 885 pounds for the pen of three. The average fleece is given as weighing 8 or 9 pounds, and of the best quality for worsted manufactures; and rams are reported as having sheared 20 pounds of wool. The ewes are prolific, producing 150 lambs to the 100 ewes. The Oxford-Downs mature early, dressing 80

to 90 pounds of superior mutton at fourteen months of age. They are hardy, herd well, and are good feeders. They have a head much like the Cotswold, with the tuft on the forehead, but with dark gray face and legs like the Hampshires, but the grey is lighter than that of the South-Downs. The fleece is thick and somewhat curled, giving 8 to 10 pounds

HAMPSHIRE DOWN SHEEP.



each, yearly, for the ewes, and twelve to fifteen pounds for the rams. The wool is six to seven inches long, lustrous, neither hairy nor harsh, but even in quality. This breed has as yet been but sparsely introduced into the United States, but wherever it has fallen into good hands, has been much liked, and is fully worthy of more extended trial, especially on

soft and spongy lands, where its constitutional vigor should stand it in good stead.

VIII. Middle and Short-wooled British Sheep.

The middle and short-wooled sheep of Great Britain are comprised principally in the following breeds: The Black-faced and the White-faced Highland sheep; the Hampshire-Downs; the Oxford-Downs; the Shropshire-Downs; the Cheviots; the Dorsets; the Welsh Mountain sheep, and the mixed Mountain sheep of Ireland.

IX. White-faced Mountain Sheep.

Wales has long been noted for one of the indigenous breeds of British sheep, as it also has been as possessing one of the indigenous breeds of British cattle. This breed seems clearly allied to the Highland sheep of Scotland, and long occupied much of the low lands and hill region adjoining Wales. Its principal recommendation is the superior quality of the



LINCOLN EWE, GIBSON'S 162, BY ROYAL DUKE.
Grand Champion Ewe of her Breed.

mutton, which, however, seldom weighs more than eight to ten pounds per quarter. These sheep are hardy, good nurses, with faces white, rusty-brown, or speckled with grey. The fleeces weigh only about two pounds each, but the wool is famous for its quality of not shrinking in washing, a quality probably due, mainly, to the fact of its being home-spun, since the same quality is allowed to all home-spun flannel in a greater or less degree.



SHROPSHIRE.

Best Type of Their Breed.—Specially photographed for this work.

X. Black-faced Highland or Scotch Sheep.

This breed is celebrated for its great hardiness and for its power of withstanding cold and living on scanty food even when the ground is covered with snow, as well as for its superior mutton. It is the oldest breed known in Scotland. The face is black; the muzzle thick; the horns of the rams massive and spirally curved; eyes bright and wild; the body square and compact. They herd well together, are docile and easily handled. When fat, the carcass will weigh from sixty to seventy pounds, and yields mutton of exceedingly fine flavor. The ewes are excellent and careful mothers, and for these reasons we have given them a place in this



LINCOLN RAM, GIBSON'S 155, BY ROYAL DUKE.
Grand Champion Ram of his Breed.

work; in some mountain regions of America, this and the Welsh Mountain breed may come to be of value. The fleece of the White-faced breed will weigh about three pounds, but is adapted only to the manufacture of coarser fabrics, as carpets, blankets and rugs.

XI. Hampshire-Downs.

The Hampshire-Downs are a mixed breed, originating by crossing the South-Down on the native breed of Hampshire, followed later by the Cotswold. During this infusion of improved blood, they have retained their original hardy constitutions in a remarkable degree. Before the war they were much esteemed in the South, as being larger and fully as

good in their mutton as the South-Downs. The lambs at a year old, under good keep, will weigh 100 pounds each, and the fleeces give six to seven pounds of excellent combing wool. The mutton is not overloaded

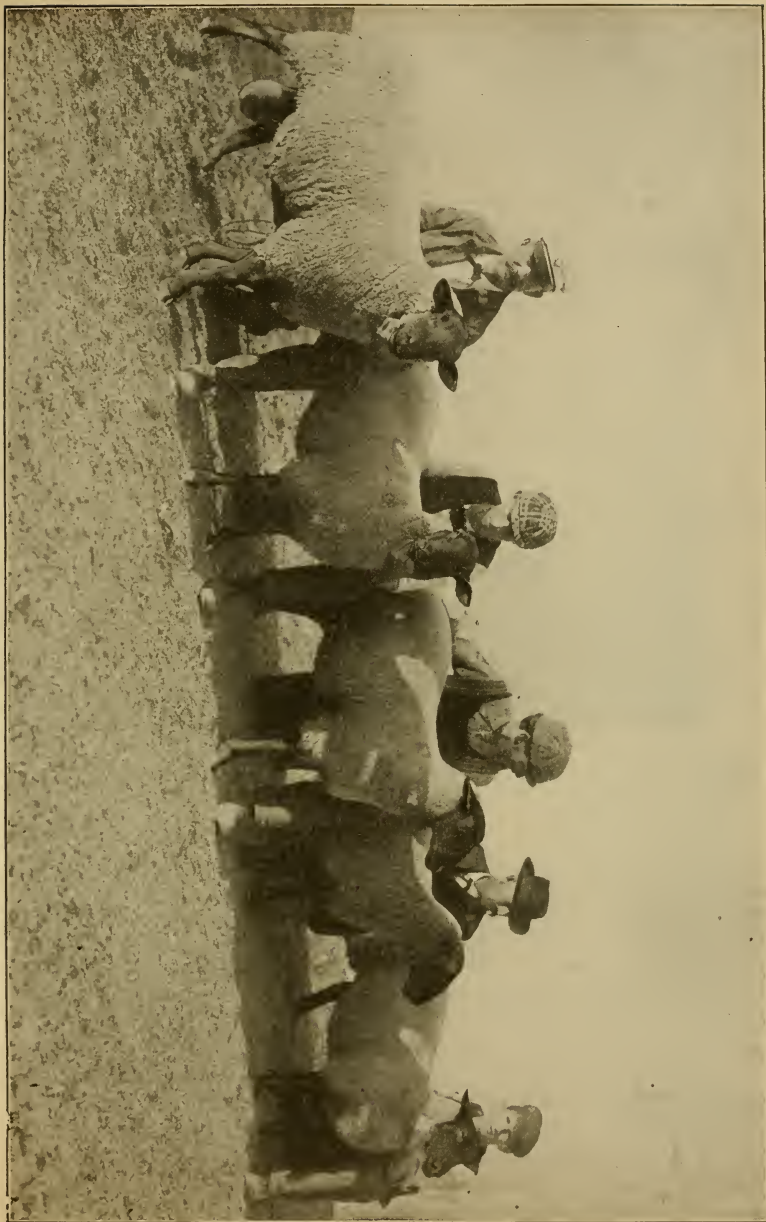


LEICESTER LAMBS.

with fat, and is juicy and excellent in flavor. The Hampshire-Downs are a hornless breed with black face; roman nose; large head; the whole frame massive and compact; the barrel round and the limbs strong and short.

XII. Shropshire-Downs.

The original of the Shropshire-Downs is an old English breed which were kept on what was known as Marfe common, a tract of some 600,000 acres. They were horned; black or brown faced; hardy, and constitutionally excellent; yielding a medium fine fleece, of about two pounds weight; and about fifty pounds of excellent mutton when mature. Crossed with the Cotswold in the latter part of the last century, and later with the Leicester and South-Down, careful selection has produced a sheep without horns; faces and legs of a peculiar spotted gray or darker color; small, firm head; handsome ears; thick but handsome neck; broad deep breast—a round-barreled, broad-backed, fine-horned sheep, that at two years old, will dress 100 pounds, and under extra feed 120 pounds, of excellent mutton. The fleece is long, glossy and will yield about seven pounds of washed wool. The ewes are prolific and good mothers, and wherever known in the United States and Canada, are highly prized.



AMERICAN TUNIS SHEEP.

Specially photographed for this work.

XIII. South-Downs.

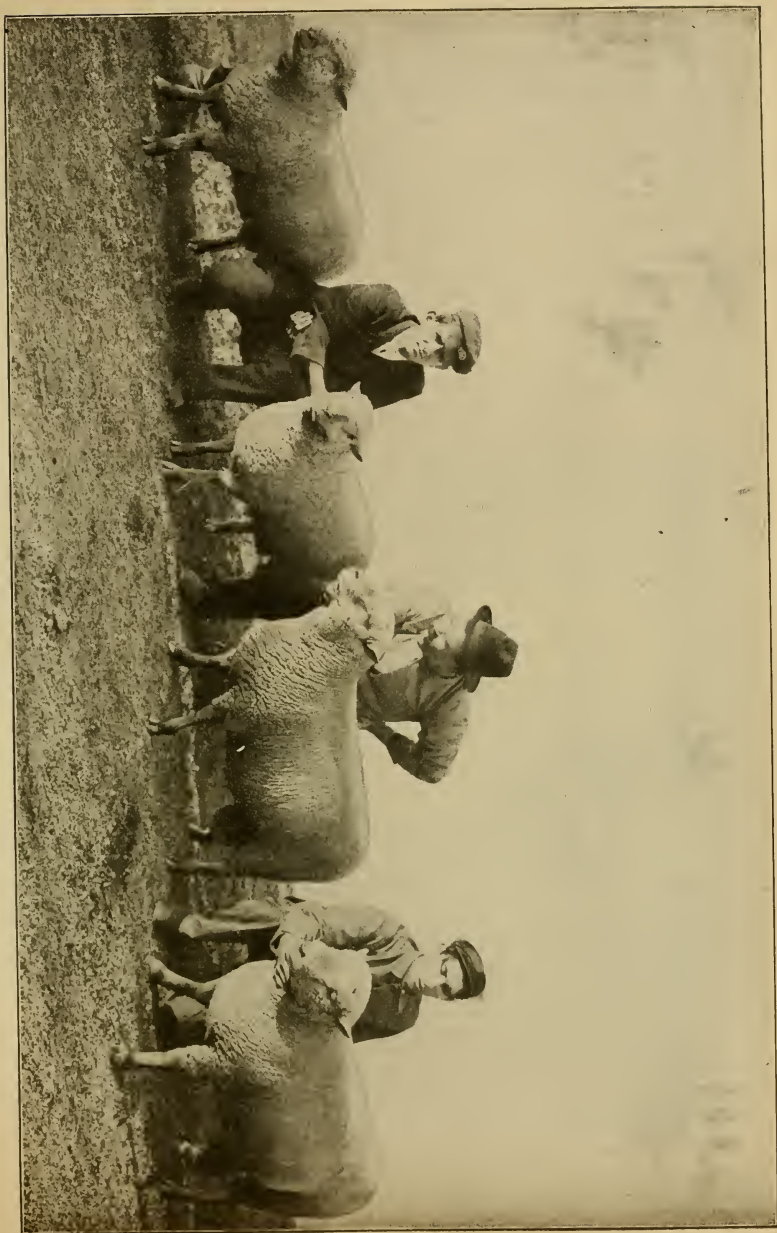
The South-Downs, once the most celebrated of the mutton breeds, both in England and the United States, ought probably still to be the favorites wherever the production of mutton is the chief aim of the breeder. But in the United States, wool is the most valuable product of sheep husbandry, and in England the South-Downs have, of late years, given place in many districts to the breeds heretofore mentioned, which combine good mutton with superior wool. This is very generally the case in the United States, and especially in the West, except in the vicinity of large cities where superior mutton commands high prices. Still, the South-Downs have been bred for many years in the United States, and are found in all sections of the country. The ewes are very



HAMPSHIRE EWES.

prolific. The staple of the wool is fine and curled, with spiral ends, well adapted to carding. They are models of what a mutton and hill sheep should be; in shape and character they have altered very much from the old-time South-Downs, being smaller in the bone, equally hardy, and with a greater disposition to fatten is combined a heavier carcass when fat. The head of the modern South-Down should be of a medium length, and the lips thin; the under-jaw, or chap, fine and thin; the ears tolerably wide apart, well covered with wool, full and thin; the forehead well covered with wool, especially between the ears, and the eye full and bright, but not prominent.

The neck should be of proportionate length, thin next the head, and enlarging towards the shoulders, where it should be broad and straight on the top, and not what is generally called ewe-necked. The breast should be wide and deep, projecting well forward between the fore-legs. This is considered an essential point with graziers, as the breast gives the sheep a greater degree of weight, and also indicates a good constitution and disposition to thrive.



GROUP SOUTHDOWN LAMBS.
Specially photographed for this work.

The shoulders should be on a level with the back, and not too wide above. If the shoulder-plates are very wide on the top, it is generally found that the animal drops behind them. The back should be flat, from the shoulders to the setting on of the tail. The ribs should project horizontally from the spine, extending far backward, and the last rib projecting more than the others. The rump should be long and broad, the tail set on high, and nearly on a level with the spine; the hips wide, and the space between them and the last rib on either side as narrow as possible, thus preventing the dropping of the belly; the ribs generally presenting a circular form. The legs should be of proportionate length; the hind legs full in the inside at the point called the twist; the hock, or hough, rather turning out. The fore-legs should be straight from the breast to the foot; the face and legs of a dark brown color.

XIV. Other Breeds of Great Britain.

The breeds of sheep in Great Britain are as varied as the neighborhoods, very few of them, except those already mentioned, having more than a local reputation. In the summary of breeds, a few pages further on, these will be mentioned in connection with some of those described in the preceding pages. The only additional English breed necessary to illustrate here is the Dorset sheep.

XV. Dorset Sheep.

The Dorset sheep, while probably of the same origin as the Welsh Mountain, and the Scotch Highland sheep, are peculiar, we believe, to



GROUP LEICESTER SHEEP.

Dorsetshire. They are a hardy, active, strong, heavily horned race, that would seem to be well able to take care of themselves in inhospitable

regions. They are larger in every way than the Highlanders, prolific, and both rams and ewes are horned. They are said to produce young twice in the season, and this is turned to account, since the mutton of the lambs is excellent, and sells for good prices. At two years old they are said to dress 100 pounds each, and the fleeces are close, soft and white, and comb well, and weigh about six pounds each. It is probable that they might have some value in the mountain regions, where the lambs might be made available in some near market.

XVI. Fine Woolled Sheep.

The principal breeds of fine woolled sheep that have attained a good reputation, are: The Spanish, the Saxony, the Silesian, the French Merinos, and the American Merinos. The latter breed, years since famous all over the United States, is the result of careful breeding from Span-



SHROPSHIRE YEARLING EWES.

ish stock. All the other breeds have been carefully tried in the United States but not with satisfaction. Both the Saxony and the Silesians have exceedingly fine wool. In Australia many of the flocks have received an infusion of Saxon blood; but at the Centennial Exhibition at Philadelphia, there was nothing in the vast variety of these fleeces to induce

American breeders to make a change in their own fine-wooled sheep. A cross of the French Merino on American Merinos, and a second cross, making the strain three-quarters American and one-quarter French, resulted in increased size, but the animals were tender and bad feeders. This might have been expected, since the French Merinos are at best a mongrel race. It is doubtful if now a flock of French Merinos can be found in the United States.

XVII. American Merinos.

So widely disseminated are this most valuable breed in every portion of the United States, and so well known are they, that it is not necessary to go into a description of their origin further than what has been given.



DORSETS.

Suffice it to say they are now divided into three families, known as the Atwood, the Rich, and the Hammond Merinos, from the names of the three original breeders of these strains. They have been improved by long continued and careful selections.

XVIII. The Atwood and Hammond Merinos.

The Atwood Merinos were originated in 1813 by Mr. Atwood, from what were known as the Humphrey stock. About 1844 Mr. Hammond, from selections from the Atwood flock, produced the larger breed of American Merinos, perfect in the length and thickness of fleece and thickness of staple, and characterized by great looseness of the skin, which lies in soft, low, rounded ridges over the body, but offering no obstruction to the shears. These were originally of Infantado and Paular blood, the Paulars, it is said, prevailing.

XIX. The Rich Merinos.

These were originally descended from the pure Paulars of Spain, and by careful breeding and selection were much improved by Mr. Silas Rich, of Vermont, and by his son. Thus the American Merinos originated from the choicest families from the herds of Spanish grandees, at the time of their confiscation and sale by the Spanish government, about 1809. Hon. Wm. Jarvis, at that time United States Consul at Lisbon, bought 3,500 sheep from the flocks of the Paulars, Negrettis, Agueirres and Montarcos. The flocks of these grandees are said to have amounted to an aggregate of 50,000 sheep. The animals bought by Mr. Jarvis were the cream of Spanish flocks, and with the Infantados, make up the five families which constitute the ground-work of the American Merinos, now acknowledged to be the most valuable fine-wooled sheep in the world.

Thus we possess the descendants of the Infantados, large, compact, rather long bodied, and the descendants of the Paulars, smaller but exceedingly rich in all that constitutes fine wool—two well marked families that would be injured by the infusion of foreign blood, from whatever source it might come.

XX. About Sheep in General.

In Great Britain the breeding and feeding of sheep has been second in importance only to that of cattle. Since the settlement of Australia and the other British dependencies, the breeding of fine-wooled sheep in England has been almost entirely abandoned, and long, medium and short-wooled sheep—valuable as well for mutton as for their fleeces—have taken their place, leaving to the United States, and to the British colonies, the almost exclusive breeding of fine-wooled sheep—Saxony, Silesian, and French and Spanish Merinos. This production has grown into great magnitude, owing to the fact before stated, that these Merinos may be kept in immense flocks, and to the added reason, that, in Australasia and in Texas, New Mexico, and the great American plains east of the Rocky mountains, there are vast ranges of country where stock of all kinds may be herded at a minimum cost.

The sheep of the world are estimated at 600,000,000 head, yielding 2,000,000,000 pounds of wool annually. Of this number Great Britain has 35,000,000 sheep, shearing annually 218,000,000 pounds of wool. This wool is principally of long, middle and short staple, but is not what is known as fine wool. The rough wool, medium fine to coarse, but not uniform in its texture, is produced in South America and Mexico from 58,000,000 sheep, yielding annually 174,000,000 pounds of wool; in North Africa, with 20,000,000 sheep yielding 45,000,000 pounds; and

in Asia with 175,000,000 sheep, yielding annually 350,000,000 pounds of wool. Now if we add 25,000,000 sheep to these numbers for the mountain regions and northern portions of Europe, Greece, and Turkey, and 50,000,000 for Russia, producing in all 164,000,000 pounds of wool, the entire balance of the world may be set down as the home of fine-wooled sheep. Of these Australia has 60,000,000; the United States 36,000,000; the Cape of Good Hope 12,000,000; Germany 29,000,000; Austro-Hungary 21,000,000; France 26,000,000; Spain 22,000,000; Italy 11,000,000; Portugal 2,750,000 sheep. Of all these countries, Australia produces the finest wool, while the United States and Canada come next, although Canada is essentially a mutton producing country, which the United States is not, for the number of sheep kept.

Notwithstanding the immense area in the United States adapted to sheep husbandry, the industry has not kept pace with the demand, and until ten years ago our wool imports were constantly on the increase in spite of the yearly increase of our flocks. From 1870 to 1875, only two-thirds of our manufactured wool product was home grown. Since that time our annual imports have not increased. The bulk of imported wool is of low grade carpet wools, and unwashed Merino, and constituting only one-fourth of the product manufactured.

XXI. The Average Wool per Sheep.

In the United States the average weight of wool per fleece is over five pounds; in Australia it is over four pounds; in Great Britain four and three-quarters pounds; in the German Empire three and two-thirds pounds; in France four and five-sixths pounds; in Austro-Hungary three pounds. South American fleeces are variable in weight, but much lighter than those of Australia, and probably will not average more than three pounds of wool each.

XXII. Summary of British Breeds.

The report to the Government of the United States, following the Vienna Exhibition, states the characteristics of prominent English breeds as follows: The British breeds are most naturally divided according to altitudes and fertility of their habitat. The large breeds, white, hornless, and bearing long wool with small felting property, occupy the rich alluvial districts, the lands reclaimed from the sea, and the highly cultivated and very productive farm-areas. These are the Leicester, Lincoln, Romney-Marsh, Cotswold, the few remaining of the Devonshire Notts, the Rosecommon, and similar Irish sheep. Next should be classed the sheep of the chalk-downs, the commons and forests, suited to a dry and temperate climate. These are the Downs of several families, perhaps now to

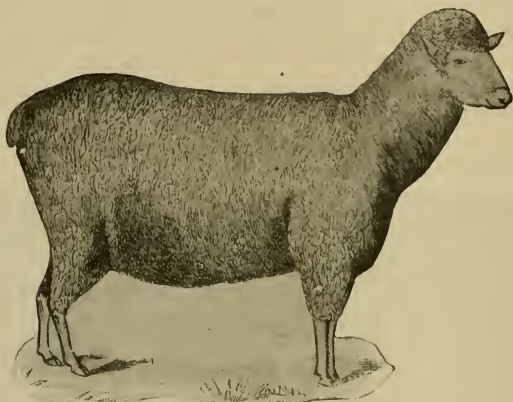
be taken as breeds, the Dorsets and their congeners—the pink-nosed Somersets. They produce a short, felting-wool, suited to inferior grades of goods. The Ryeland, formerly found in the western counties, and esteemed for producing the finest cloth-wool of England, is now almost extinct. The third general division comprises the mountain breeds, first the Cheviots of the hills of the North of England and borders of Scotland; the Black-face of the central chain of mountains and moors northward from Derbyshire to the mountains of Scotland; and two varieties of Welsh mountain-sheep, and the Kerry and other mountain breeds of Ireland. There are many local remnants of the ancient stock allied to the above, but there are none worthy of special mention. The weight of fleece of British sheep averages about five pounds. The Lincolns may be placed at eight pounds, the Cotswolds nearly the same, the Leicesters at seven, the Downs at four, the Cheviots at three, the Black-faces at two and one-half, and the Welsh at two. The Leicesters are most numerous, exceeding one-third of all; the Downs one-sixth, the Black-faces nearly as many, Cheviots one-eighth, leaving about one-fifth for other breeds. The heavy breeds of eighty years ago, modified mainly by the Leicester, now furnish lighter fleeces.



BUNCH OF YEARLING CHEVIOT LAMBS.

XXIII. The Sheep in Australia.*

Spain rendered a great service to the world in preserving the purity of the ancient blood in sheep. It remained for other countries to improve the stock by means of the modern art of breeding. While some of the early Australian breeders gave attention to improvement by selection; stocking up the "runs" was in general the first consideration and when at length the time for considering the quality of the sheep arrived, the flocks presented wide opportunities for improvement. The wool was fine; but the fleece was small and the staple short. The frame was small, and the ill-shaped body bore wool only on the back, while there was much to be desired in the way of evenness of quality throughout the fleece. What had to be accomplished in order to produce the Australian merino of to-day is shown by



TYPE OF SPANISH MERINO EWE IMPORTED TO AUSTRALIA IN 1828.

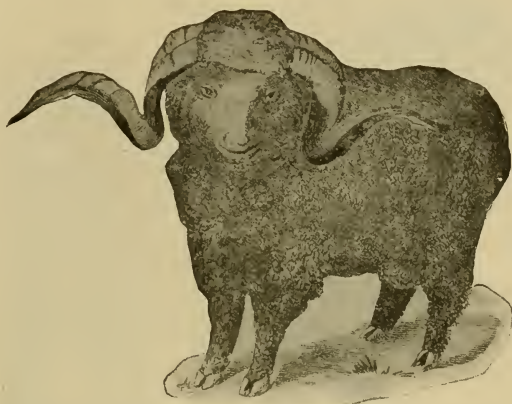
the representation of a merino of the time from the Royal Spanish flocks. Not content with securing the best breed of sheep in the world, the Australian breeder set about bringing it to the highest point of perfection. The wool must not only be fine, but it must also be long, and of brilliant whiteness, and it must cover the entire surface of the animal, the legs, head and under-parts all taking part in producing the wool crop. The tip of the nose and the hoofs are the only parts that do not bear wool, as may be seen by the illustration of a typical Australian merino. There had to be an enlargement of the body, and the area of wool-bearing skin was farther extended by a skillful arrangement of folds and pleats. This enlarged area was also subjected to a kind of intensive cultivation. Two piles of wool had to be made to grow where only one grew before; the crop had to grow thicker on the ground, "density" being carried to its extreme limit.

* For this article on "The Sheep in Australia" we are indebted to the December issue of the admirable magazine "LIFE" issued monthly at Melbourne, Australia, for which courtesy on the part of its publishers due acknowledgment is here made.

Meanwhile, attention was also being paid to the "evenness" of the crop, for Nature had no use for wool of equal fineness on every part of the sheep. The skill of the breeder, however, managed to coax Nature into producing an even fleece, and the development of the most perfect fine-wool sheep in the world was complete.

XXIV. The Wool Harvest.

It would have been possible to develop a few ideal sheep in special stud flocks, without having brought the general flocks of the country up to a high standard, but there has been a remarkable all-round improvement. Before sheep-classing, selection, and culling became general, the average



TYPE OF SPANISH MERINO RAM IMPORTED TO AUSTRALIA IN 1823.

yield of wool was not more than three pounds or three and a half pounds per head, but the return has been gradually increased to a general average of about seven pounds per sheep. Last year the clip of Australia and New Zealand, according to Dalgety's review of wool, averaged seven pounds four ounces per head, and its average value per head of sheep and lambs was 5s. 10d. (\$1.40). Another indication of the increasing size of the fleeces is the average number of fleeces per bale of wool. The returns bearing upon this point show a marked enlargement of the fleece even within the last ten years. The number of fleeces of sheep's and lamb's wool averaged 59.65, 60.08, and 59.62 for the years 1897, 1898, and 1899, as compared with 51.72, 47.79, and 46.49 for the years 1908, 1909, and 1910; while improvement in the same direction is indicated by the increased number of bales required on the average to contain the fleeces of 1000 sheep. For the

three years ending in 1899, the average number was 16.68; while for the three years ending in 1910 the average was 20.70. That the increase in the quantity or weight of fleece per sheep has not been secured by any sacrifice of the high quality of the wool is sufficiently proved by the unrivalled market-value of the clip. According to "Dalgety's Review" the average value of all wool sold in Australasian markets this season has been $9\frac{3}{4}d.$ ($19\frac{1}{2}$ cents) per pound, as compared with $8\frac{1}{2}d.$ (17 cents) last year, and $9\frac{1}{2}d.$ (19 cents) the year before. The bales averaged a weight of 335.3 pounds, and the average price per bale was £13 12s. 2d. (\$63.58). Pastoralists have not allowed their efforts in improving their sheep, and producing wool of the highest excellence, to divert their attention from the



A CHAMPION AUSTRALIAN MERINO EWE OF 1911.

best methods of preparing the product for market, for their methods have long been held up by brokers and buyers as an example to the producers of other countries.

XXV. Where the World's Sheep are Located.

All these remarkable advances in the quality of wool, weight of fleece, and excellence of marketing arrangements, have been achieved concurrently with an active increase in the number of sheep. As compared with other wool-producing countries Australia is only an infant in years; but it has already outgrown all competitors. The sheep of the Commonwealth now number 92,000,000; New Zealand flocks bringing the Australasian

total up to 115,525,000. Half of Australia's sheep are in New South Wales, or, precisely, 46,194,178; while there are 19,593,791 in Queensland; 12,937,983 in Victoria; 6,898,450 in South Australia; 4,692,419 in Western Australia; and 1,928,053 in Tasmania. In recent years there has been a rapid increase, and it promises well for the future of the world. The Argentine comes next to Australia, with a total of 62,000,000 sheep, these figures showing a decrease of no less than 7,000,000 in five years. As will be seen by the diagram, Australia's lead is a long one. Russia follows the Argentine with 61,500,000; then comes the United States with 56,000,000, and a long way in the rear are South Africa with 32,800,000, the



"DONALD DINNIE," A CHAMPION AUSTRALIAN MERINO RAM.

United Kingdom with 31,800,000, British India with 18,000,000, France with 17,000,000, Spain with 16,000,000, Italy with 10,800,000; while among the countries possessing less than ten million sheep, Canada appears with 2,800,000. When the figures are considered in relation to population, Australia's twenty sheep per capita must be taken as convincing evidence of the exceptionally favorable climatic and other natural conditions under which the keeping of sheep is carried on.

XXVI. The World's Greatest Wool-Supply.

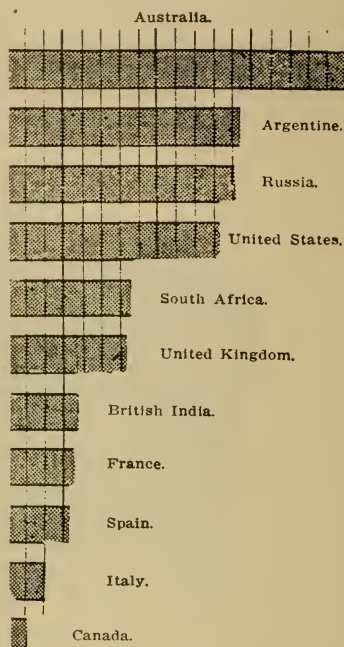
The magnitude of the wool-producing industry and its condition of rapid expansion are shown by the table of exports. Taking the last twelve years, it is seen that there has been, not only a continuous increase, but also the maintenance of an increasing proportion to the general total of

other exports. There has been an increase in the value of Australasian wool exports from £16,136,082 in 1881, to £33,128,496 in 1909, and the percentage of wool to the total exports in the same period increased from 33.11 to 38.97; or, taking the average, the total annual exports amounted to £71,809,832, and those of wool to £23,897,836, the average percentage of wool to the whole being 33.28. For the year ended June 30, 1910, the exports of wool from Australia and New Zealand were 1,921,507 bales and 513,136 bales respectively.

That Australia is the greatest wool exporting country in the world, and as a wool-producer among the continents nearly equals Europe in quantity, may be seen from the following table of the world's wool-production published in "Dalgety's Review:"

	Lbs.
North America	347,320,749
South America	545,119,560
Europe	804,905,074
Asia	210,399,000
Africa	139,702,000
Australasia	756,690,162
Oceania	100,000
Total	2,804,236,546

The total is equal to about 8,497,384 bales, and the Australasian contribution is equal to 26.98 per cent of the whole, while about 75 per cent of the Australasian clip consists of fine merino wool. As the sheep of the world are decreasing, there are prospects of a growing demand for Australasia's golden fleece.



THE SHEEP OF ELEVEN COUNTRIES.
(Each vertical section represents five million sheep, Australia leading with ninety-two millions.)



DELAINE RAM, RAMBOUILLET RAM AND TWO RAMBOUILLET EWES.

Many Times Prize Winners.—Specially photographed for this work.

CHAPTER III.

BREEDING AND CARE OF SHEEP.

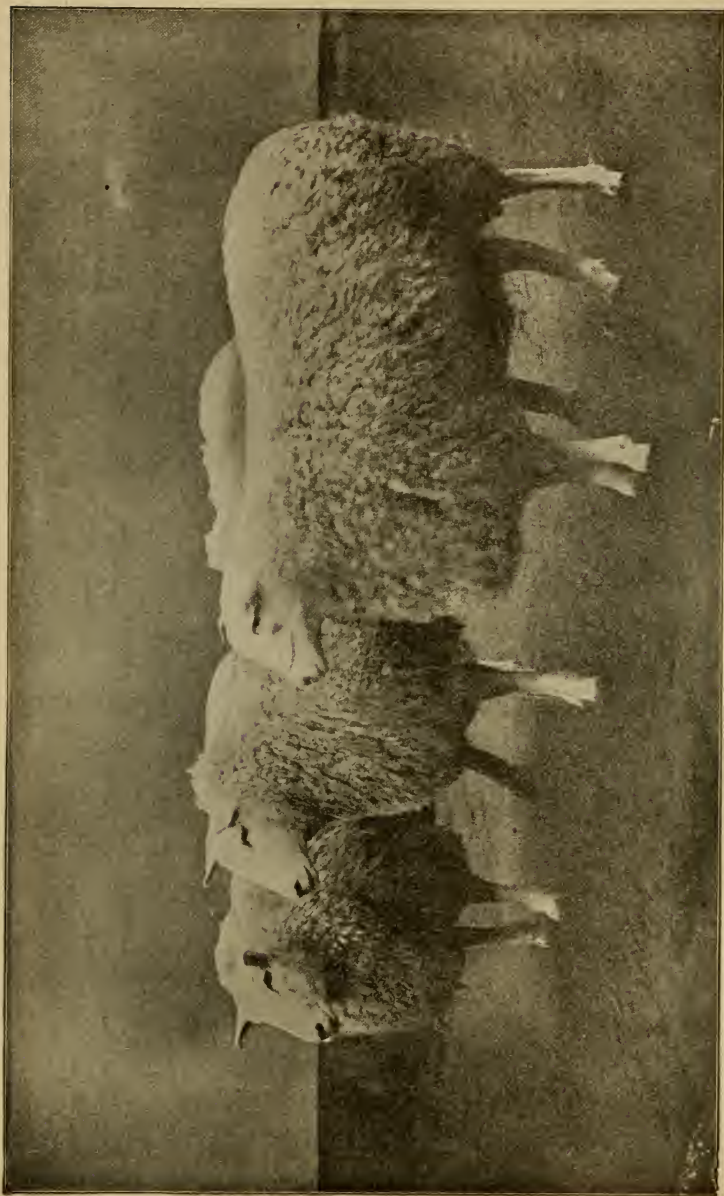
- I. CONSTANT WATCHFULNESS NECESSARY.—II. THE BREEDING AGE OF SHEEP.—III. CROSSING.—IV. COUPLING.—V. THE PROPER TIME FOR COUPLING.—VI. GESTATION.—VII. KEEP A RECORD OF THE BREEDING.—VIII. MANAGEMENT AND TRAINING OF RAMS.—IX. PASTURAGE FOR SHEEP.—X. WATER.—XI. PROTECTION FROM INSECTS.—XII. EARLY AND LATE PASTURE AND FEEDING.—XIII. WINTER FEEDING.—XIV. SHEEP BARN.—XV. GRADING THE SHEEP.—XVI. FEEDING TROUGHS AND RACKS.—XVII. CASTRATION AND DOCKING.—XVIII. WEANING THE LAMBS.—XIX. LAMBING TIME.—XX. THE NURSERY.—XXI. TAGGING SHEEP.—XXII. WASHING AND SHEARING.—XXIII. TYING THE WOOL.—XXIV. DIPPING AND ANOINTING SHEEP.—XXV. A WORD ABOUT GOATS.—XXVI. A PROFITABLE INDUSTRY.—XXVII. HABITS OF THE ANGORA.—XXVIII. AN ASSISTANT TO THE FARMER.—XXIX. ANGORAS IN THE UNITED STATES.—XXX. CAPABILITIES OF THE MILCH GOAT.

I. Constant Watchfulness Necessary.

Constant care and attention are necessary in the management of sheep. They are timid, without self-reliance, a prey to dogs; and even foxes will destroy the lambs. The necessity of keeping large flocks together causes them to be especially liable to contagious and epidemic diseases. In any district where many sheep are kept, wandering curs must be destroyed. They are worse than wolves and foxes; for the latter may be guarded against at night, while dogs scare and destroy sheep in the day time as well. Care must, also, be taken to secure them against contagious and epidemic diseases. The shepherd must be watchful, vigilant and attentive, summer and winter; it is worth his while to be so, for there is money in sheep, once in the fleece and once in the carcass.

II. The Breeding Age of Sheep.

The proper age for sheep to breed is two years. The ewe may be placed with the buck in the autumn after she is one year old, and thereafter she may continue to breed until the age of ten years. But unless there is something in a buck or ewe more than ordinarily valuable, it is hardly economy to continue them breeding beyond seven or eight years old. From the age of three to eight years the best lambs will be produced. Under exceptional circumstances a strong ram will cover 100 ewes if allowed only one service each; but as a rule it is better to keep a ram for each fifty ewes.



CROSS-BRED WETHER SHEEP.

III. Crossing.

Unless the breeder be thoroughly informed, and is breeding with a view to the establishment of a new breed, in which distinct characteristics are to be perpetuated, nothing is gained by crossing two distinct breeds. The breeding of grades is different. If the farmer cannot afford to breed pure stock, the American Merino may be crossed upon any of the ordinary fine-wooled sheep of a district. In like manner the Downs will improve the quality of the mutton and wool; the Leicester will give increased size and early maturity, and length of the wool staple; so will the Cotswold, and the latter will certainly get good constituted sheep. The breeding of Merinos upon long-wooled sheep should never be thought of.

IV. Coupling.

In breeding in flock, when more than one ram is kept, select the ewes most fitted to each ram. At the coupling season, drive a flock to the yard and let the proper ram in to them; never allow more than one service, and, as soon as performed, separate the ewe, and so proceed until all the ewes in proper condition are served. Never allow a teaser, that is, an aproned ram, to run with the flock. Make a record of the ewes served, and if from the fourteenth to the seventeenth day they do not again come into heat, they may be considered to be with lamb; but to make sure, they may be returned to the ram upon the thirteenth day after service.

V. The Proper Time for Coupling.

November is the season for coupling; but if the object be to raise the sheep for mutton and wool, the lambs should not be dropped until after the time of grass, unless a place artificially warmed be provided for weaning. If the object be to sell young lambs, the earlier in the season they are produced the more money they will bring.

VI. Gestation.

Ewes carry their young on an average of 152 days from the time of successful service. Twenty-two weeks is usually allowed, but the time may vary a week or ten days either way; 146 days is the shortest period and 161 days the longest.

VII. Keep a Record of Breeding.

There is nothing more important in breeding animals—especially pure-bred animals and grades—than to keep a careful record of the breeding. If you buy or breed an animal intended for breeding, enter its age and pedigree, unless the entry is already made in a public record (herd book),

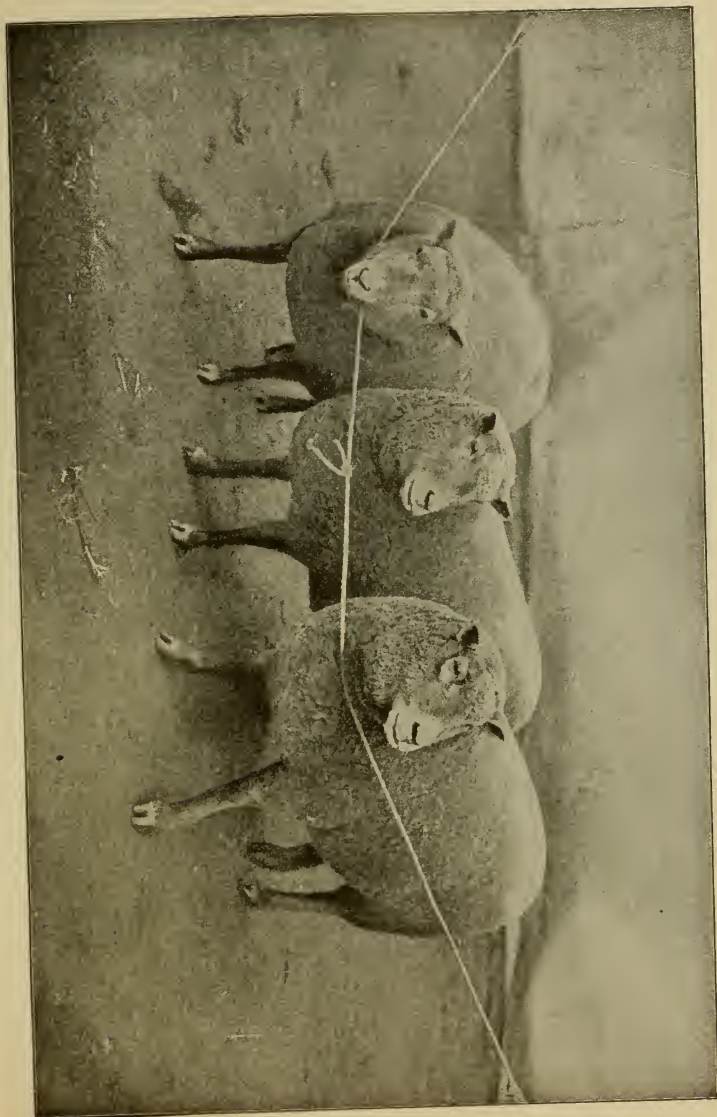
in which case refer to it by page and number. Write down, also, every trait and characteristic, even to the minutest, including feeding and thriving qualities; it will save you much care and vexation in future. If you are breeding sheep, preserve samples of the wool from year to year, and attach to the samples a record of weights, with comparison of quality from year to year, and one fleece with another. Thus, on all occasions, you may satisfy not only yourself, but any buyer as to the quality of your herd. Even with ordinary flocks, a carefully kept register of name, age, characteristics, and quality will be found useful.

VIII. Management and Training of Rams.

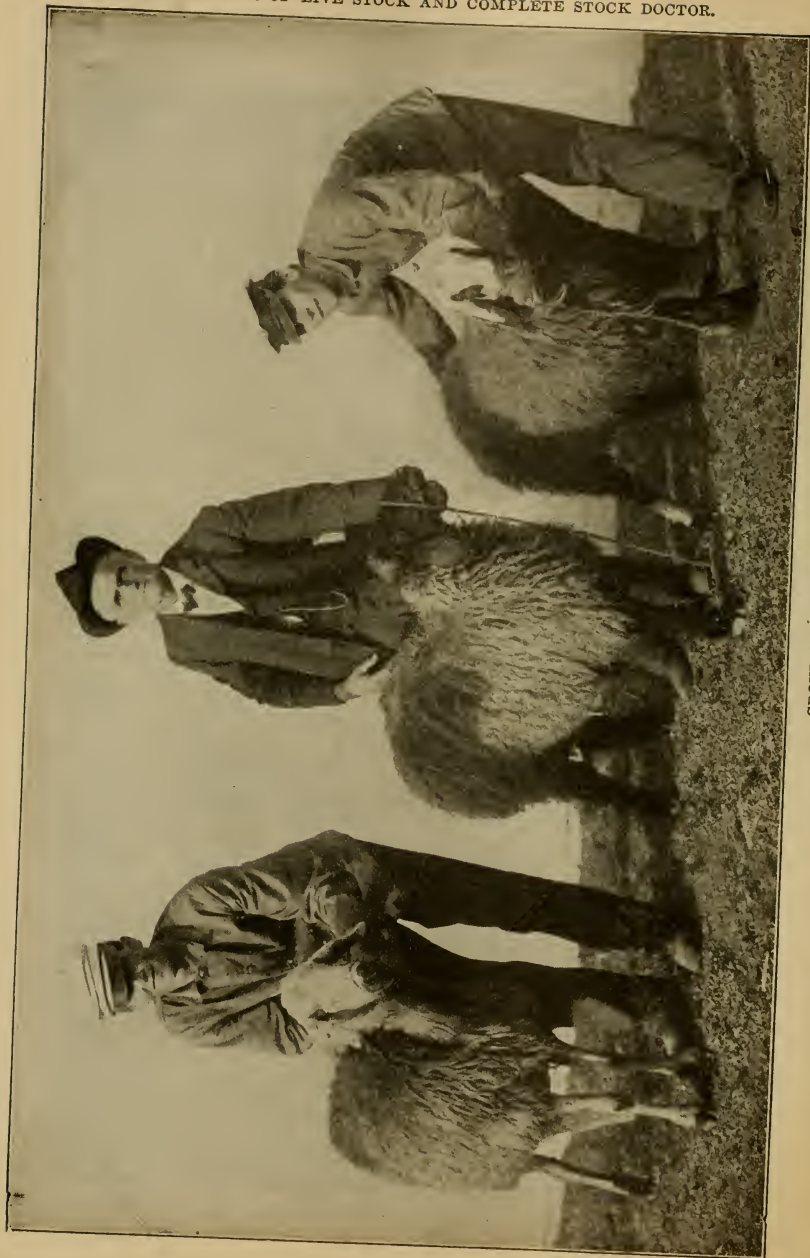
Rams should be trained to docility and obedience, and this is not difficult to do. They should never be allowed to run with the flock of ewes, but should have separate pastures and enclosures, clean and comfortable, and entirely disconnected from the flocks. They should be trained to lead and to be handled; and if more than twenty ewes are to be served during the season, the ram should have extra feed and care for at least six weeks before tupping time. One hundred and fifty ewes have been served by a single ram during an extended season, but under the best of keeping less than 100 is better than over that number. Do not let a ram serve more than two or three ewes in the beginning of the season, increasing the number to five, and even ten, if necessity demands. As the season approaches the close, restrict him again to a small number, for an exhausted male cannot get strong progeny. To keep the reproductive powers in full vigor, daily exercise must be kept up. There is more in this than many persons imagine.

IX. Pasturage for Sheep.

Sheep eat a variety of vegetation other than the true grasses. They are fond of many weeds, and if allowed they will soon reduce the weeds that spring up after harvest. All the pasture grasses are natural to sheep, except those, like Timothy, which close feeding is apt to kill. Blue grass, orchard grass, the fescues, red-top, rye grass, etc., may be the main dependence for sheep; clovers they do not like so well. In pasturing ewes with lambs it is well to have spaces through which the lambs can pass, and yet which will not permit the egress of the ewes. In England these are called lamb creeps; this arrangement often enables the lambs to get much succulent food outside, and they do no damage to crops. In fact, sheep are often turned into corn-fields, and other hoed crops, late in the season, to eat the weeds, of which they are fond. They will soon clean a crop if it be such as they will not damage.



SOUTHDOWN SHEEP.



GROUP PERSIAN SHEEP.
Specially photographed for this work.

X. Water.

It has been said that sheep require no water when pasturing. Do not listen to such folly. On very succulent grass they will live without it, and as a rule, take but little. They should always have it to take when



SUFFOLK SHEEP.

they desire. Like any other animal, sometimes their systems requires more than at others. This is especially true during suckling time. See that they have it, and of pure quality. Sheep, above all other animals, should never drink from stagnant pools.

XI. Protection from Insects.

In summer, sheep should have shelter where they may escape from the many insects that torment them, especially the sheep gad fly, and others producing internal parasites; also, during July and August, provide a plowed surface of mellow soil, and smear their noses, if necessary, daily with tar.

XII. Early and Late Pasture and Feeding.

The better your early and late pastures are, the easier you can winter your sheep, especially in the West where few roots are raised. Attend to this, and supplement the pastures by sowing rye and other hardy cereal grains, which may be done on corn land of the same season, at the last

plowing, and upon grain land intended for hoed crops next season. Light grain, of little other value, will prove a mine of wealth in this way if sown as directed.

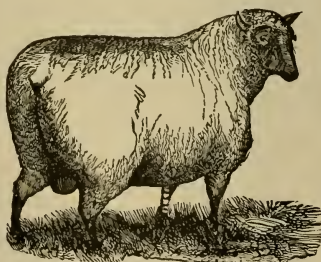
Never allow your sheep to fall away in flesh before they are put into the feeding yards and barns for the winter. The time to feed is before they begin to lose flesh. They will, indeed, shrink in weight somewhat, as the feed becomes dry, but it will be principally moisture that they lose, if proper feeding be kept up. When the full succulence of the flesh is to be kept up, there is nothing better than roots—Swedish turnips, carrots and beets being the most profitable in the West. At all events, as the pastures become dry, let the sheep have one feed a day of something better than they can pick up in the fields.

XIII. Winter Feeding.

You cannot have an even texture of wool, if sheep are allowed to fall away greatly in flesh, or even receive a decided check. Every time this occurs, a weak place will be found in the wool. Nor can you raise heavy fleeces on hay. If you do not intend to take the best of care of sheep, and keep them thriving, you had better not keep any but the commonest kinds. It is true, you will lose money on these, but then you will have the satisfaction of knowing that you have lost less money than you would have lost on better ones.



ALLOWED TO SHIFT FOR ITSELF.



WINTERED WITH GOOD SHELTER AND FEED

The feeding of roots is essential to the best care of sheep, especially when the succulence of the flesh is to be retained; but roots are not absolutely necessary. The question of cost must be considered in connection with grain. Carrots and parsnips may be raised with proper implements and put in pits for five dollars per ton; and Swedish turnips and mangel wurzels, for about three dollars or less. Carrots are excellent for ewes before lambing time, and parsnips for those giving milk; the latter may be left all winter in the ground and be fed up to the time grass becomes flush. Beets should not be fed until after January on account of

an acrid principle they contain when first pitted. They are best when used after the Swedes are exhausted.

XIV. Sheep Barns.

These need not be expensive structures, since it is only necessary to provide shelter that will keep out wind and water, and at the same time admit of proper ventilation. Ventilators for the escape of foul air must be provided at the peak of the roof, and sliding doors and windows are needed to allow the ingress of air, according to the wind and temperature.



BLACK-FACED RAM.

Champion and First Prize Black-Faced Ram, Glasgow, Scotland.

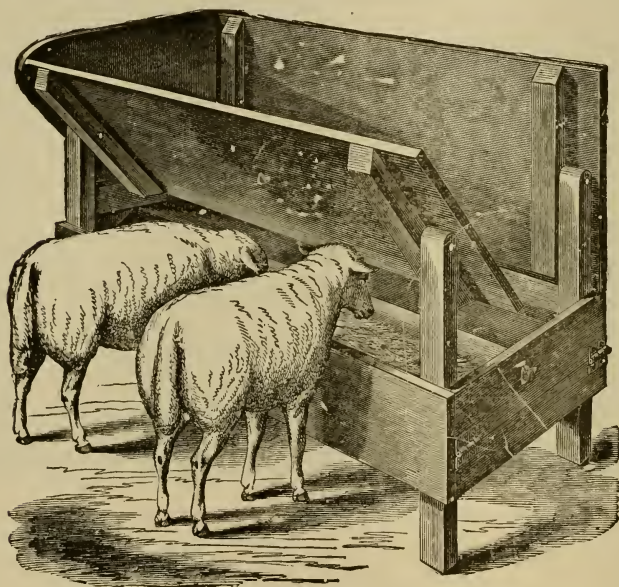
Let there be a passage-way through the center, if many sheep be kept, wide enough to admit a wagon—say nine feet—for ease in feeding and cleaning. On each side of this passage should be the racks and troughs for feeding, the pens being arranged so as to accommodate about twenty-five sheep each. In very severe weather this passage may be used for sheltering sheep kept in open sheds, if necessary. The illustration shows one of the simplest forms of shelter, a structure of poles covered with hay.

XV. Grading the Sheep.

Sheep in winter should be carefully graded, according to size, strength and condition. Strong lambs should not be put with weak ones; the same rule applies with ewes and wethers. Rams should never be kept with any other sheep; nor should ewes be kept with wethers. Fattening sheep will, of course, always be kept by themselves. The larger the flock the more closely can sheep and lambs be graded, according to age, size, strength and other conditions.

XVI. Feeding Troughs and Racks.

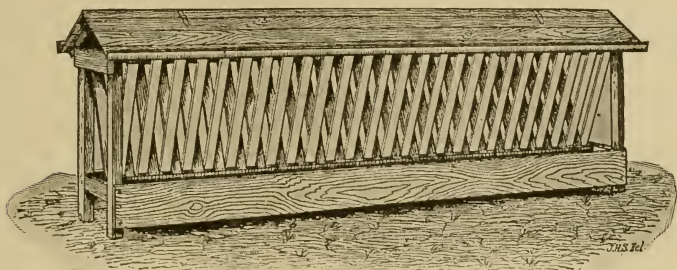
Sheep should never be fed on the ground, but from suitable troughs and racks. The arrangement of these will depend upon whether the sheep are to be fed under shelter or not. The racks should be low enough for the



COMBINATION TROUGH.

sheep readily to get the fodder without reaching too high, and below should be a receptacle for catching the waste. The illustration given shows a good form of feeding trough; if intended for hay, let the slanting board be of slats or it may economically be made double, so as to

allow feeding on both sides. Again, it may be used alternately for both hay and grain; the hinged doors allow easy cleaning. The back is up-



RACKS WITH TROUGHS FOR FEEDING SHEEP.

right; the center boards are movable to work up or down, so that when feeding from both sides they rest together on the center beam.

XVII. Castration and Docking.

Lambs should be castrated at from two to four days old. A lamb is held by an assistant, who turns him upon his back, holding the rump between the knees—the head towards himself—taking the fore and hind legs in each hand, putting the fore legs outside of the hind, and holding them firmly just above the knee joints. The operator takes hold of the pouch and pulls it gently, so as to get as much as possible of it, and then with a sharp knife at a single stroke, or better, a pair of strong shears, takes off the pouch pretty close to the testicle. Then take a firm hold of each testicle separately between the fore finger and thumb of the right hand, and pull it out with all the cord that adheres to it. This completes the operation. The reason for cutting off all the pouch that can be easily pulled beyond the testicle is, that it leaves a much evenner surface for shearing than if only a little is taken off. This operation should be performed in the morning, and the lambs then turned out to move about, which will, in a great measure, prevent any disposition to swelling or stiffening of the parts, which is frequently the case if they are allowed to lie still for a time afterward.

Docking should be performed as soon as they recover from the gelding, generally about three days afterward. This operation should be performed with a single stroke of a sharp knife, and in the evening, being careful to sever the tail at a joint, the assistant drawing the skin of the tail to the body, so that the end will well cover the stub. Then allow

the flock to lie down and keep quiet and still, so that they may lose the least possible amount of blood. By morning the wound will be sufficiently dried that no fear of bleeding need be entertained, unless by accident. In no case should they be driven or put to any extra exertion immediately after being docked, for sometimes they will bleed to death. If much bleeding ensues, touch the part lightly with a red-hot iron.

XVIII. Weaning the Lambs.

Spring lambs should be weaned only in the fall, so the dams may have the advantage of grass to recuperate before winter. Lambs, in fact, should do well enough if weaned at three months old, and four months' suckling is ample; nothing is gained by allowing them to run longer with the dams. When once taken away, they should be placed entirely out of sight and hearing of the dams, and if several are together they will sooner become contented.

XIX. Lambing Time.

Especial care must be taken of the ewes at and near lambing time. If the weather is not warm enough to fully prevent chilling, fire heat and a secure place must be provided until the lamb is dried and has taken the



AMERICAN DORSET RAM.

teat. A young lamb is the tenderest of all farm animals, and a ewe is very apt to become indifferent to a weak lamb. Hence the necessity of that constant care and watchfulness, which will suggest itself to every intelligent person.

XX. The Nursery.

Every shepherd should provide a nursery for sheep that are ailing, especially in winter. This may even be made available as a place for lambing. It is better, however, that both a lambing place and a nursery be provided, since fire is essential for new-born lambs early in the season.

XXI. Tagging Sheep.

This is important and should be performed as soon in the spring as possible, certainly before the sheep are turned to grass. Secure the sheep and cut away all the wool about the buttocks liable to gather dirt and dung which accumulates in balls. It will improve the sheep and save much trouble at shearing time.

XXII. Washing and Shearing.

We do not believe in washing sheep. It is distressing and dangerous to the sheep, and the wool often becomes dirty again before shearing. But if the sheep are to be washed, it should be done in clear, running water, on a gravelly bottom, or under a stream of water. Do not shear for three days or more after washing, according to the weather.

It is important that the shearing be properly done, and no unskilful person should be allowed to handle the shears. It is better to pay an extra price than to allow the skin of the sheep to be clipped and torn in shearing. If the sheep have been washed, shearing should take place when the oily-feeling matter, termed yolk, has so far reappeared in the wool as to give it its natural brilliant appearance and silky feeling. The wool should be cut off evenly and smoothly, reasonably close, but not leaving the skin naked and red, which renders the sheep very liable to receive injury from cold. Stubble shearing and trimming, leaving the wool long, so as to give the next fleece the appearance of extraordinary length, or leaving it long in places, in order to affect the apparent shape of the animal, are both frauds, but are sometimes practiced by unscrupulous persons, on sheep intended for show or for sale.

XXIII. Tying the Wool.

The fleece should be as little broken as possible in shearing. It should be gathered up carefully, placed on a smooth table, with the inside ends down, put into the exact shape in which it came from the sheep, and pressed close together. If there are dung-balls, they should be removed. Fold in each side one-quarter, next the neck and breech one-quarter, and the fleece will then be in an oblong square form, some

twenty inches wide, and twenty-five or thirty inches long. Then fold it once more lengthwise and it is ready to be rolled up and tied, or placed in the press.

XXIV. Dipping and Anointing Sheep.

For freeing sheep of vermin, as lice and ticks, and also to free them from mange and other itch insects, recourse must be had to dipping, as it is termed. When large flocks are kept, this is the only course



TUNIS OR AFRICAN RAMS
Specially photographed for this work.

to pursue. When but few sheep are kept, the cure is accomplished generally by anointing them with any of the preparations in common use for this purpose. For those who prefer ointments, the following will be found good: One pound mercurial ointment, one-half pint oil of turpentine, one pound resin, and six pounds of lard. Dissolve the resin in the turpentine; dissolve the lard by gentle heat, mix the mercurial ointment thoroughly with it, and when cold rub both preparations well together. In applying this, the wool must be parted well down to the skin from between the ears to the tail. From this similar partings should be made along the shoulders and thighs to the legs and also parallel ones

along the sides. These furrows must have the ointment lightly rubbed into the skin as they are formed.

For dipping sheep, suitable yards, a dipping trough, and pripping platform must be provided; also means for heating and keeping the liquor hot. The following is one of the best mixtures, having met with favor in England, Australia and America: Three pounds arsenic, three pounds pearl ash, three pounds sulphur, three pounds soft soap. Mix in ten gallons of boiling water, stir, but avoid the fumes, and add ninety gallons



TUNIS OR AFRICAN EWES.
Photographed for this work.

of cold water. Prepare a tank that will easily allow a sheep to be dipped, having a slanted, slatted drain at the side, tight bottom underneath, to allow the drip to run back. Dip the sheep, back down, being careful not to allow the head to enter the poisonous mixture, letting the animal remain one minute. Lift on to the slats and rub and squeeze the wool, until pretty well drained, and place in a yard until dry. When partly dry, go over the heads with the ointment as recommended in case the flock is too small to allow the expense of preparing for dipping.

XXV. A Word About Goats.

Mr. R. A. Haste in *Farm Life* gives the following practical information on the subject of goats:

THE ANGORA GOAT—A COMING MONEY-MAKER.

In the minds of most people a goat is a goat; and the mental image conjured up by that name is an impudent tramp who haunts back alleys and revels in a diet of tin cans, or feasts upon unprotected dry goods



IMPORTED ANGORA BUCK—GRAND CHAMPION PRIZE WINNER.

swinging from low-hanging clothes lines—a four-footed Ishmaelite outside the pale of the law—a hairy, horned personification of lawless impudence and worthless vagabondage. This is also the picture conveyed by the parable of Holy Writ, wherein the shepherd divideth his flock, placing the sheep upon his right hand, the goats upon his left. To be a goat, then, is to be an irredeemable outcast consigned to everlasting darkness. So it was in the days of parables, and so it is now in more liberal times. In the classic language of the street to “butt in” is to



HAMPSHIRE DOWNS.

Many Times Prize Winners in England and America.—Specially photographed for this work.

make a nuisance of one's self after the manner of Bearded Billy, the goat. What wonder, then, that it is hard for the goat family to shake off the reputation of 2,000 years, especially when that reputation is sanctioned by the Holy Word.

But there are goats and goats. The Angora is not a worthless vagabond like his bearded cousin, who loafs about the streets, a cheap clown making fun for small boys, an unspeakable "butter in," whose chief delight is to "chew the rag;" on the contrary, he is an aristocrat, dignified and decorous, a thing of beauty and a source of profit to his owner. Moreover, he has an interesting history.

Although born and reared in the mountainous regions about Angora, a province 200 miles southeast of Constantinople, he is thoroughly at home in any part of the world where fortune takes him.

It was in 1846 that Dr. James B. Davis of Columbia, S. C., at the request of the Sultan, was sent to Turkey by President Polk to make experiments in the culture of cotton. So well pleased was the Sultan with Mr. Davis and his work that, as an expression of his appreciation, he presented him on his return to the United States with nine Royal Angora goats. These were the progenitors of the present Angora goats in this country.

Uncle Sam, however, did not make much of the Sultan's hint, for after the lapse of sixty years the total number of goats within the United States does not exceed 500,000. This seems insignificant when compared with 75,000,000, the estimated goat population of the world.

XXVI. A Profitable Industry.

No domestic animal, not even the reindeer, is more thoroughly adapted to man's use than the Angora goat; and yet for some reason the goat industry has not taken root in this country. Everything seems favorable, the climate is admirable, and the food supply is abundant. The slow progress made in the development of this industry is more than likely due to a lack of information regarding the profits that can be derived from the business.

I have little doubt that the Golden Fleece that Jason went forth to find was the fleece of the first Angora. For the fleece of the pure Angora is neither wool nor hair, but a fibre with qualities distinctly its own—it is the mohair of commerce. From it are made not only the plushes but the finer fabrics of ladies' wear, such as crepons and brilliantines. The fibre is from three to six inches long, and the annual clip averages about six pounds. The market price for mohair runs from twenty to forty cents per pound, the average in the United States being about thirty

cents. Here is an annual profit of at least \$1.50 per head, not counting the increase, which is rapid.

A large percentage of the Angoras in this country are not pure bred, but are the results of crosses with the common goat. This impairs the value of the fleece by introducing the hair of the common goat, called kemp. This kemp will not take dyes, and therefore must be removed before the mohair can be used.

The fleece, however, is but one of five sources of profit—and not always the greatest. The United States at present imports annually about \$35,000,000 worth of goat skins. For what purpose? For gloves, shoes



ANGORA KID—PRIZE WINNER OREGON ANGORA GOAT SHOW.

and for a hundred small toilet articles. Many a chamois skin did its first service on the back of some luckless kid.

The value of a goat skin depends largely upon its commercial reputation, *i. e.*, the locality from which it comes. For instance, the Curacao kid has a special value, although not one specimen in a hundred is produced on the island; the vast bulk of this particular brand is imported from the mainland of Venezuela and Colombia.

Another and a most important source of revenue are the untanned pelts. There seems to be no limit to their usefulness and their popularity. Taken when the hair is about four inches long they make the finest kind of rugs. The readiness with which they take and retain dyes renders them particularly valuable as carriage robes. Indeed, they have

about displaced the disappearing buffalo robe. Undyed, the hair retains its brilliant luster. In its original white, nothing compares with the Angora as a robe for the baby carriage.

These skins with the fleece on are also used extensively in making children's muffs and—tell it not—the beautiful white fur on My Lady's opera cloak is the skin of the little Angora kid. Yes, it is known by another name, or My Lady would not wear it—but a rose by any other name is still a rose. And it is not My Lady alone who is deceived. Many a fine gentleman wears the coat of an old Angora wether thinking he is decked in genuine astrakan.

The profit in goat keeping is not confined to the skin and the fleece. The flesh is sold readily at market prices ranging above those of mutton. It is a well-known fact that when goats are fed on grass, their flesh has the flavor of mutton, but when kept exclusively on browse, it takes the flavor of venison, and sells for that in the market—in the proper season, of course.

XXVII. Habits of the Angora.

As I have remarked, the Angora is not dainty; he is adapted to a very wide range of climate and physical conditions. He seems to thrive equally well in the climate of Mexico and in that of Canada. Naturally the better and heavier fleece is produced in the colder climates. In southern latitudes it is necessary to clip the fleece twice a year to prevent shedding. Then, again, a dry climate is preferable to a humid one, and a rough and semi-mountainous country to a level plain. The goat is by nature a climber—an inheritance of his ancestors in the rugged mountains and tablelands of Asia Minor.

The most interesting thing about the goat is his diet. In this respect he differs from all his farm associates—and radically. He is a browser, and prefers leaves, twigs and weeds to the best white clover or blue-grass that ever grew. This is one of his strong points. He does not interfere with the feed of the other stock. Sheep have been called four-footed locusts; they will utterly destroy the most carefully prepared pasture in one season. In a single summer a flock of goats will create a pasture out of a brush-covered common.

Turn fifty goats into a forty-acre pasture covered with brush, weeds and all manner of foul growths, and in two years the work of reclamation will be done; the brush will be dead, the weeds exterminated, and the native grasses, whatever they are, will be in complete possession.

XXVIII. An Assistant to the Farmer.

Like the honey-bee, the Angora goat works for his owner and boards himself. He will eat what the other members of the farm animals spurn. At the same time he will do as much as a gang of men toward clearing the farm of brush and weeds. In this respect a herd of goats is of especial value to farmers living on the cut-over lands in the timbered regions of this country. These cut-over lands have grown up with brush which is often about as difficult to clear as the original timber. Goats eat the leaves and small twigs, and the brush, thus deprived of its breathing apparatus, dies, root and branch. The best time for goating



AMERICAN MILK GOAT.

a field of brush is in early summer, when the sun is hot. It does not take long to reduce a field of vigorous second growth to the condition of bare and dry whip stalks. When the goat cannot get leaves he takes the bark of small saplings; in this way he does the work of the ax. It is best in goating a field to cut all small saplings, that the goats may get at the branches. You may depend on him to keep down all sprouts.

Dr. Santley, of Iowa, who has had much experience with Angoras as land clearers, says: "Land can be cleared of the worst brush known in this country for a little less than nothing by employing Angora goats. They will pay you a profit and live on leaves and weeds, leaving the land cleaner than you can get it by any other process. At the present

time I have over 600 acres that have been reclaimed by Angoras, and a conservative estimate would be that the value of the land had thereby been enhanced at least \$10 per acre."

XXIX. Angoras in the United States.

Of the 500,000 Angora goats in the United States, four-fifths are in the Southwest, especially in California, New Mexico and Texas. Yet there is not a state in the Union where they will not do well, as well as sheep, and when we consider their vast superiority as money-makers over



AMERICAN MILK GOAT.
Specially photographed for this work.

the sheep, it seems strange that shrewd live-stock men have not seen the handwriting on the wall and gone more extensively into goat raising. The problem of pasturage in the West will have to be solved by the sheep men if they intend to remain in business, but the goat pasturage of the United States has not yet been touched.

In the timbered regions of the South and the Southwest, and in the cut-over sections of the North, there are millions of acres of the finest

goat pasture, not only free, but for which the goatman could get a price for clearing with his herds. All unimproved land is goat pasture. And this at present amounts to 265,000,000 acres, enough to support as many goats.

The state of Maine, for instance, according to the last census, had 6,000,000 acres in farms, one-half of which was unimproved land. Most of the Southern states have less than one-third of the land under cultivation; the balance is goat pasture.

We have a duty of 12 cents a pound on mohair. With this protection, foreign competition cannot be given as an excuse by the average farmer



YOUNG MILK GOAT.
Specially Photographed for this work.

for not going into goat raising. If there is such a demand for goat skins, Angora robes and mohair, as the returns from our custom houses show, the market here must be good.

In recent years the United States department of agriculture has been making efforts to interest the public in the Angora goat industry. Exhaustive bulletins have been issued giving information for the benefit of the general public. Yet, with the facts before them, the growth of the industry has been slow.

If I were asked what field of animal industry gave promise of the largest and most reliable returns on the investment of both labor and

capital, I should unhesitatingly reply, the raising of Angora goats. If I were asked to designate a locality in which to locate an Angora ranch, I should say any place in the United States where the climate is reasonably dry and an unlimited goat range is available. To be more particular, the states of Michigan, Wisconsin and northern Minnesota offer exceptional facilities, while Missouri, especially the Ozark region, the states of Texas and Arkansas, and the entire Allegheny region, are perfectly adapted to raising Angoras. I need not mention the extreme Southwest, for the goat is already there.

There appears to be, therefore, no adequate reason why the people



AMERICAN MILK GOAT.

of the United States should be paying tribute of \$50,000,000 annually to the goat herders of Asia, Europe and Africa, and another \$10,000,000 to the importers of goat skins and Angora robes from Mexico and South America.

XXX. Capabilities of the Milch Goat.

The two subjects uppermost in dairy circles just now are the milch goat and a milking machine. The suggestion that goat's milk is preferred for hospital patients in cities and for children everywhere, has set some enterprising men and women to speculating on the probable



Figs. 1, 2, 4—Imported Toggenburg Goats. Fig. 3—Schwarzwald Goat.

profits to be derived from dairy farms made up exclusively of goats. There is no doubt about the superiority of goat's milk over that of the cow for some purposes, and it is known that there is considerable demand for this product, but to what extent, of course, is not so easy to ascertain. The discussion naturally brings out inquiry as to the best breeds for dairy purposes, and our counsels abroad are being urged by the department to look up information in those countries where goat breeding has long been a recognized industry. The Swiss are, perhaps,



AMERICAN MILK GOAT.
Specially photographed for this work.

the most skilled of all goat-herds, their mountain slopes and elevated valleys being peculiarly adapted to goat culture. There, naturally, inquiries have been set on foot and some information of interest has been sent over from our counsel-general at St. Gall. It relates to the Toggenburg goat, a variety which seems entirely unknown in this country, but one that has long been a favorite in the land of William Tell. The milk of this goat is rich in quality, and keeps quite as well as cow's milk. It sells for three and a half to about four cents a quart. These goats breed at a year old, the time of gestation being five months. The

food in summer consists of grass and shrubs, but in winter, if the milk is to continue rich in quality, a small quantity of grain and hay must be given, and the temperature of the stall should be kept at from 57 to 60 degrees Fahrenheit.

In regard to the amount of pasture land required for the support of this animal, it is computed that six to eight goats will need as much as one cow, and that one man can manage from forty to fifty goats. Generally speaking the milk of the cow is more popular, but for children the goat's milk is in greater demand, as tuberculosis is hardly ever found in these hardy animals. The milk of the goat makes an excellent cheese and fairly good butter, but as to the latter the milk of the cow retains its pre-eminence. The meat of the young goats, from five to twelve weeks old, is considered a great luxury. Indeed, it is often mistaken for venison, and sells for from 29 cents to 39 cents for 2.1 pounds. This compares very favorably with the average price received in Switzerland for beef, which is 33 cents to 37 cents for 2.2 pounds.

The average clip on long-haired goats is about 4.4 pounds. The hair is not very marketable, but is used in some instances for ropes, which are very strong and defy the action of water. The skins are worth from 29 cents to 58 cents each, but the finest and best bring as much as \$1.35 each.

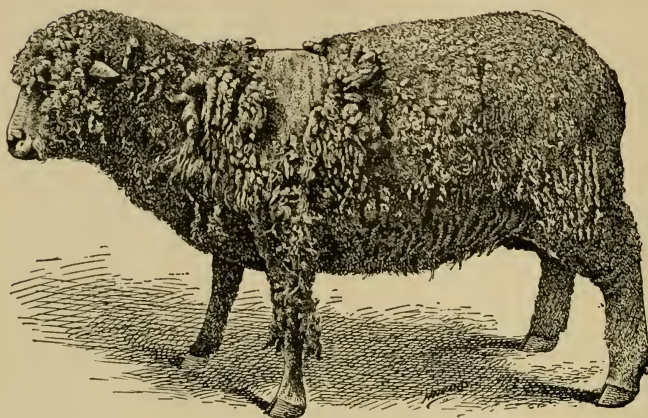
If well cared for, these animals will give milk from their first to their tenth year, when they decrease in flow and finally dry up. Ordinarily they will produce milk for eight months in a year. The price of these animals is higher in the spring than in the fall, but average for a good one, from one to three years old (male) in the fall, is \$9.65 to \$19.30. Females of the same age bring \$7.72 to \$9.65; four-year-olds bring as high as \$13.51.

BOOK IV

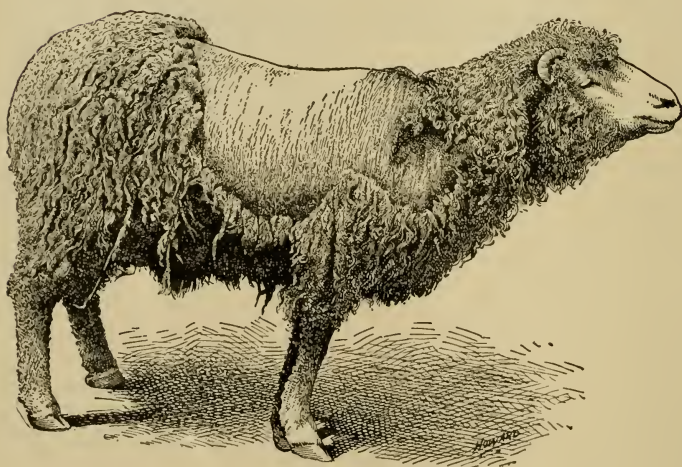
PART II

Diseases of Sheep

HOW TO KNOW THEM; THEIR CAUSES, PRE
VENTION AND CURE



COMMON SCAB.
First Pronounced Manifestation.



COMMON SCAB, ADVANCED CASE.

DISEASES OF SHEEP.

CHAPTER I.

GENERAL DISEASES.

- I. REFERRING TO SCIENTIFIC TERMS.—II. INFLAMMATORY DISEASES.—III. DISTEMPER OR EPIZOOTIC CATARRH.—IV. GRUBS IN THE HEAD.—V. HYDATIDS ON THE BRAIN.—VI. APOPLEXY.—VII. INFLAMMATION OF THE BRAIN.—VIII. INFLAMMATION OF THE EYES.—IX. SWELLED HEAD.—X. VEGETABLE POISONING.—XI. TETANUS OR LOCK-JAW.—XII. PARALYSIS OR PALSY.—XIII. RABIES OR CANINE MADNESS.

I. Referring to Scientific Terms.

The anatomy and explanation of the terms used to designate the several parts of a sheep have been treated of in Chapter I of Part VII. A careful study of these is necessary to enable the flock-owner intelligently to undertake the cure of disease, as well as to enable him to become nicely conversant with all that goes to make up physical perfection in the animal. The knowledge of these things is an important integer in constituting the difference between haphazard and practically intelligent breeding, management, and cure of diseases, and may save the intelligent man valuable animals and much money yearly. In the United States and Canada, the fatal diseases to which sheep are subject are comparatively few; and this is especially true in the West and Southwest, owing, probably, to the fact that the summer and autumn are comparatively dry and equable, and the winters not characterized by excessive dampness.

II. Inflammatory Diseases.

Diseases of an inflammatory nature are prolific causes of death among sheep in Great Britain. In America, our sheep are comparatively exempt from these diseases. Mr. Spooner remarked this fact, in comparing English and American sheep, and attributed the cause to the more artificial care of sheep in England. Whatever the cause may have been in his day, this will not now apply; for in no country is all farm stock more highly fed than in the United States and Canada. The real cause undoubtedly lies, first, in the climate, and second, in the greater intelligence of our flock masters. They neither intrust sheep nor other farm stock

to ignorant servants, who, perhaps, can neither read nor write, and who add superstition to ignorance. The intelligence of the master keeps pace fully with all that is new in the art of farming, and this intelligence is quickly caught by the workmen and shepherds.

III. Distemper or Epizoötic Catarrh.

Sheep distemper or Malignant Epizoötic Catarrh, is an epizoöty that is sometimes fatal in sheep, both East and West. The disease in its malignant form is a severe congestion and inflammation of the lining membranes of the nasal cavities, sometimes extending to the stomach and bowels.

How to know it.—There is a slight watery discharge from the nostrils and eyes; there is depression and more or less loss of appetite; the pulse is slightly increased in frequency and is weak; the breathing is not changed unless the bronchial tubes are affected; there is no cough. At the end of a week, unless the animal gets relief, the nasal discharge is thick and glutinous, and sometimes tinged with blood; the eyes are half closed and the lids are gummed with a yellow secretion; there is great prostration and emaciation; the pulse is very weak; respiration is difficult; the appetite is lost, and the animal soon after dies.

What to do.—There should be no bleeding or purging. Remove the sheep to warm, well-ventilated quarters, and if the bowels are costive, prepare the following:

No. 1.	1 Ounce carbonate of ammonia,
	1 Ounce rhubarb,
	2 Ounces ginger,
	2 Ounces gentian.

Simmer the rhubarb, ginger and gentian for fifteen minutes in a quart of water, and, when cold, add the ammonia and cork the bottle. Give two tablespoonfuls four times a day. Keep up the strength of the sheep with good food and nourishing drinks. Good nursing is of equal importance with the other treatment, for if the sheep are neglected they will either die or become so enfeebled as to be of little value.

IV. Grubs in the Head.

Causes.—This is caused by the eggs of the sheep gadfly (*Æstrus Ovis*),

being deposited in the nostrils of the sheep in July and August. The eggs being deposited, the maggots hatch and find their way through the sinuses, causing much pain. When the gadflies are seeking the sheep, the animals will crowd together,

SHEEP GAD-
FLY.

with their noses to the ground, stamping violently at times, and will run from one place in the pasture to another. When the maggots reach their resting place they attach themselves by their hooks, and are not easily dislodged.



GRUB OF
GADFLY.

What to do.—The grubs may often be extracted by a competent surgeon, but it is a nice operation, and scarcely pays except in the case of a very valuable animal. Burning leather under the noses of the sheep in a close place, to cause violent sneezing, used to be practiced, but it is unsafe. Injecting up the nostrils equal parts of sweet oil and turpentine will often dislodge the grubs when they are not firmly fixed, but care must be taken not to strangle the sheep.

Prevention.—Prevention is in this case far the best remedy. Keep a portion of the field plowed so the soil is loose and dry. Smear the sheep's noses once a day with tar during the season of the fly, and catch as many of the flies as possible, by means of a light bag-net. The most convenient way to apply the pine tar, in case of large flacks, is to smear the inside of the salt troughs with it; then they will smear their own noses while eating the salt.

V. Hydatids on the Brain.

Causes.—The bladder worm, causing this dangerous disease, is one of the forms of the tape worm of the dog, the *tenia serrata*, preceding the true or sexually perfect worm. It is rare in America, probably from the fact that there are fewer dogs in proportion to the population than in England.

What to do.—Once fixed, nothing practically can be done, though, when located, surgeons have pierced the cysts with a strong hypodermic syringe, injecting therein half a teaspoonful of the following:

No. 2.	1 Grain iodine,
	5 Grains iodide of potash,
	1 Ounce water.
	Mix.

Prevention.—Never allow dogs to feed on sheeps' heads, or other garbage, unless cooked in the most thorough manner, remove the excrements of dogs wherever found in the pastures, and kill all dogs that make a habit of prowling about, away from home.

VI. Apoplexy.

This disease is mostly confined to sheep that are plethoric and fat.

What to do.—The sheep will leap suddenly in the air, fall, and unless promptly relieved, will die in a few minutes. Then the only remedy is sudden and copious bleeding from the jugular vein.

Prevention.—Fat sheep should be carefully watched for the earlier symptoms. If a sheep appears dull and partially unconscious of what is going on; if the nostrils and pupils of the eyes are dilated, and the membranes of the nose deep red or violet; the pulse hard and the breathing stertorous, bleed immediately and give afterwards two ounces of epsom salts, to be followed by an ounce every six hours, until a full evacuation takes place from the bowels.

VII. Inflammation of the Brain.

This is produced by the same causes that produce apoplexy, and is often a secondary effect of apoplexy. The animal is dull and inactive; the eyes red and protruding, and, as the symptoms intensify, the animal rushes about in the wildest delirium. The general treatment is the same as for apoplexy.

VIII. Inflammation of the Eyes.

What to do.—If there is serious inflammation, take a little blood from the facial vein, the vein running down obliquely from the eye. Bathe the eyes with the following wash :

No. 3.	5 Grains nitrate of silver,
	1 Ounce soft water,
	15 Drops laudanum.

Dissolve the nitrate of silver in the water and add the laudanum ; mix. Bathe the eyes well three times a day and apply the lotion twice a day with a camel's hair brush.

IX. Swelled Head.

Causes.—This is produced by a variety of causes, the bites of venomous serpents and malignant insects, etc. Snake bites usually produce death before the animal is found.

What to do.—In case of the bites of venomous insects, cut the wool from around the parts, and bathe with strong saleratus water and give internally, if necessary, each hour until relief is obtained, the following :

No. 4.	$\frac{1}{2}$ Drachm chloral hydrate,
	1 Ounce soft water.
	Mix.

X. Vegetable Poisoning.

What to do.—In case of trouble from vegetable poisoning, bathe the affected parts thoroughly with warm water, and keep moist with the following lotion :

No. 5.	1 Ounce sugar of lead,
	1 Pint soft water.
	Mix.

XI. Tetanus or Lock-Jaw.

Causes.—There are various causes producing this difficulty, as inflammation of the membranes after gelding, injury to the horns and hoofs, or a wound on any part of the body.

How to know it.—The animal, if able to walk at all, does so with great distress ; the jaws are set, and death generally takes place quickly. It is an excited condition of the nervous system. See lock-jaw of the horse.

What to do.—Treatment is of little use, the malady being usually fatal. Put the sheep into a dark place alone, and put a piece of Solid Extract of Belladonna, the size of a pea, on the tongue twice a day; put oatmeal water in the pen for him to drink. Warmth and quiet are essential. Bleeding used to be considered a specific by many, but it should not be practiced. Move the bowels as soon as possible, and follow this up with belladonna. Give four ounces of castor oil as the laxative. When the worst symptoms are overcome, give gruels and other soft nourishing food until recovery.

XII. Paralysis or Palsy.

Lock-jaw and epilepsy are often mistaken for palsy; yet, it is the direct opposite of them. Like the two first it is somewhat rare in America.

What to do.—The first thing to do is to make the lamb warm and comfortable. Give warm gruel, with a little ginger as a stimulant. If the bowels are costive give four ounces of linseed oil. Give twenty grains of powdered Nux Vomica in soft mash three times a day; continue this two or three weeks. If the paralysis is severe, clip off the wool and apply a blister of Spanish flies to the spine, from the points of the hips to the shoulders.

XIII. Rabies or Canine Madness.

Sheep are particularly liable to be bitten by rabid dogs in their first stages of madness. It is usually considered that flock-masters have a right to destroy any dog worrying their sheep, but by a decision not long ago, by the supreme court of Massachusetts, dogs are property; consequently, the owner of a dog is liable for all the damage done by him, and anyone that kills the dog is liable for his value. When a sheep develops rabies he might as well be destroyed at once to save suffering. See rabies in horses, page 452.

Tympanitis in Sheep:—Give internally a teaspoonful of turpentine in a little water or pass a rubber tube down the throat. As a last resort puncture the stomach with a trochar as you would cattle.

Inversion of the Womb in Sheep:—Wash it with tepid water containing a little laudinum. Replace it carefully and take a few stitches in the lips of the vulva. Elevate the ewe behind. Usually the danger is passed at the end of thirty-six hours.

CHAPTER II.

PARASITIC AND OTHER DISEASES.

I. SCAB, TICKS AND LICE.—II. FOOT-ROT.—III. FOUL IN THE FOOT.—
IV. SWOLLEN FOOT AND GRAVEL.—V. MAGGOTS FROM BLOW FLIES.—
VI. INTESTINAL WORMS.—VII. THE ROT OR LIVER FLUKE.—VIII.
LUNG WORMS.—IX. SHEEP WORRIED BY DOGS.—X. SPRAINS, STRAINS
AND BRUISES.—XI. CARE WHEN LAMBING.—XII. NAVEL ILL.—
XIII. BARE-LOT METHOD OF RAISING LAMBS TO AVOID NODULE DISEASE.

I. Scab, Ticks and Lice.

Causes.—Scab is produced by a minute microscopic, parasitic insect, which burrowing just beneath the cuticle, produces extreme irritation, and causes the exudation of a watery fluid, serum. This, in drying, forms the scab which brings away with it the wool in larger or smaller patches.



DEMODEX

Is found in sebaceous glands of the sheep and dog; it causes skin irritation and eruption.

The disease is very contagious, and the insect is so tenacious of life that it has been said to have remained in a pasture three years and then spread the infection. A careful flock master should examine every sheep purchased minutely, and take every means to keep the infection from his flock. The illustration shows sheep affected with scab in its extreme form.

How to know it.—The sheep will be restless and irritable; will rub against anything near; will bite its fleece, and scratch with its hoofs. At length the fleece becomes ragged, and drops off, to permanently infect the pasture.

What to do.—It is not difficult to cure, but the means must be thorough. A good effective remedy, though poisonous, is the following:

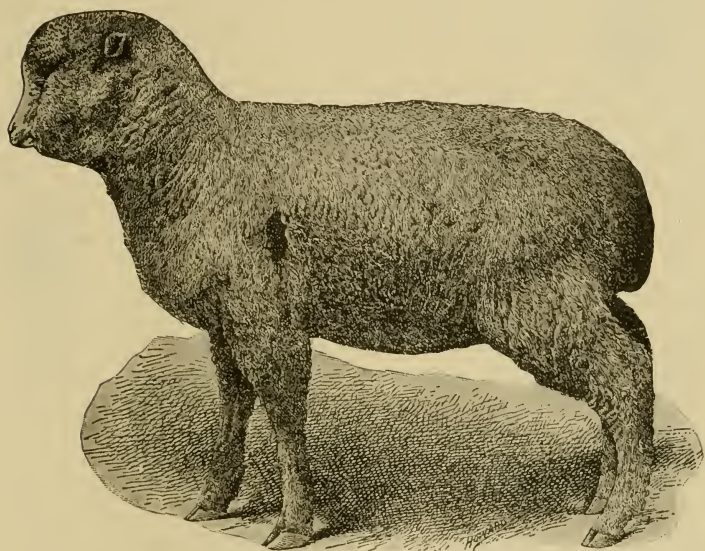
No. 6.	6 Pounds arsenic,
	6 Pounds pearl ash,
	6 Pounds sulphur,
	6 Pounds soft soap,
	20 Gallons boiling water.

Mix, but avoid the fumes, and when cold, add 180 gallons of cold water, and stir until well mixed. Prepare a tank that will readily allow a sheep to be dipped in it. From this a slanting, slotted drain, having a water-tight bottom underneath, and extending just over the edge of the tank, should be laid. Dip the sheep, back foremost, into the tank, allowing him to remain submerged in the liquid, *except the head*, for one minute. Then

place him on the slats and squeeze the wool thoroughly, and when well drained turn into a clean yard until dry. Then go over the heads of the flock with the following:

- | | |
|--------|------------------------------|
| No. 7. | 2 Pounds mercurial ointment, |
| | 6 Pounds lard, |
| | 2 Pounds rosin, |
| | 1 Pound oil of turpentine. |

Place the lard and mercurial ointment in a suitable iron pot, and immerse in a vessel of hot water, say about 180 degrees, and stir until well mixed. Then dissolve the rosin and turpentine, and when the lard is cold, rub it all well together. Apply it by parting the wool on the head between the ears, on the forehead, and under the jaws, the idea being to reach every part not touched by the dip.



A COMPARATIVELY EARLY CASE OF COMMON SCAB,
Showing a Bare Spot and a Tagging of the Wool.

In preparing No. 6, for ordinary cases, twenty pounds of strong tobacco may be simmered in the water, instead of the arsenic, and the other ingredients may be stirred in while the liquid is boiling hot, having first removed the tobacco leaves and stems. When this dip is used, the head may also be dipped, from time to time, being careful that the liquor does not get in the nose and eyes. The sheep may remain in the liquor, as hot as can be borne, four or five minutes, dipping the head occasionally, and No. 7 need not be used though it would be better. The wool must be pressed and dried, as before stated; so proceed until the flock is all gone over, using some means to keep the liquor hot.

A dip in great repute in Australia, where immense flocks are kept, is the following:

No. 8.	10 Pounds tobacco leaves,
	10 Pounds sulphur.
	50 Gallons water.

Boil the tobacco in the water, and add the sulphur while hot. Dip the sheep in the liquor, as hot as can be borne, for five minutes.

Tick.—The sheep tick is a dipterous insect, but with no wings developed. The ticks are large and live on the surface of the skin and suck blood. They are plainly seen when the wool is divided, or when the sheep are shorn; then the ticks will go off to the lambs, where there is more wool. The treatment for them may be the same as for scab.



**SHEEP TICK
WITH EGGS.**

Lice.—Lice are sometimes found on sheep; they are of the variety of bird lice, (*Trichodectes*), with large, broad head, with biting jaws, but no sucking tube. Bird lice are usually very irritating. The treatment given above will apply for lice as well as for scab and tick.

II. Foot Rot.

How to know it.—The skin at the top of the clefts of the hoofs and over the heels, which is naturally smooth, dry and pale, becomes red, moist, warm and rough, as though chafed. Next, there is a discharge; and ulcers form, extending down to the upper portion of the inner wall of the hoof. Then the walls become disorganized, and the disease penetrative, between the fleshy sole and the bottom of the hoof, an offensive and purulent matter is thrown out, and the whole foot becomes a mass of corruption, often filled with maggots. The animal early becomes lame and loses appetite, and at length dies from exhaustion. If the attack is violent, and in the first cases it generally is, it may reappear the second and third years, but in a milder form, if proper measures be taken, and this should be done at the first symptoms of lameness.



**TRICHODECTES
OF THE SHEEP.**

What to do.—Cut away all the diseased parts, cleaning the knife from time to time in weak carbolic acid. Prepare a tank and fill it to a depth of four inches with a saturated solution of blue vitriol (sulphate of copper). Keep this as hot as the sheep can bear to stand in, by occasionally introducing a piece of hot iron. Let each sheep stand in this for ten minutes or more. Then cover the hoof with chloride of lime, and

fill the cleft of the hoof with a fillet of tow, long enough for the ends to be twisted into a string to tie about the fetlock. Keep the sheep in a dry, well-littered yard on dry, short pasture, and examine the hoofs daily for some time. Renew the chloride of lime, if necessary, and feed plenty of nourishing food. It is probable that a tonic may be needed; if so, prepare the following:

No. 9.	2 Drachms common salt,
	$\frac{1}{2}$ Drachm sulphate of iron,
	$\frac{1}{2}$ Drachm nitrate of potash.

Mix as a powder, and give once a day, as circumstances may dictate.

III. Foul in the Foot.

This is a common disability, especially in sheep that have been driven on the road.

What to do.—When it is only the effect of travel, the remedy is simple. Wash the cleft and other parts of the hoof with warm, soapy water, and then touch the tender or thin parts with a feather dipped in oil of vitriol (sulphuric acid), and cover them with tar. Apply a strong solution of blue vitriol (sulphate of copper), to the cleft if any signs of foul are apparent. In driving sheep, these three things, viz., soap, sulphuric acid and blue vitriol should be kept on hand; or in place of sulphuric acid the following:

No. 10.	1 Part solution chloride of antimony,
	1 Part compound tincture of myrrh.

Mix and keep ready for use in incipient foul or travel sore. If it is a bad case the foot should be bandaged.

IV. Swollen Foot and Gravel.

How to know it.—The issue (biplex canal in the front and upper part of the hoof) becomes swollen and inflamed.

What to do.—Examine it to find if any substance is imbedded therein; if so, extract it; if swollen and inflamed, treat as advised for other swellings; if ulcerated lance it lightly to let out the matter, and dress with the compound tincture of myrrh. If the hoof becomes graveled, extract the gravel at any cost; dress as above, and cover with a small plug of tow dipped in tar.

V. Maggots from Blow Flies.

There should be no excuse for maggots accumulating in wounds, much less from the collection of filth about the thighs. If found, cleanse the

parts thoroughly, extract the maggots and touch the wounds with the following :

- | | |
|---------|--|
| No. 11. | 1 Part creosote,
4 Parts alcohol,
Mix. |
|---------|--|

Bathe daily with tincture of myrrh.

Prevention.—Keep the sheep well tagged by shearing from under the tail and thence diagonally down the thighs.

VI. Intestinal Worms.

The presence of intestinal worms is seldom known to the ordinary observer until after the death of the sheep, when they may be found by dissection. If the worms are thus found, the presumption is good that other sheep are seriously infected, for, as a rule, unless they are abundant, they do little or no harm.

What to do.—As a simple vermifuge, when their presence is suspected, ordinary wood soot, mixed with the salt the sheep naturally take will do good. In fact, if sheep are allowed plenty of salt, with the soot mixture once a week, when worms are suspected they will do well enough ; or give every two weeks, in ground feed, the following, which is enough for 80 to 100 sheep :

- | | |
|---------|--|
| No. 12. | 2 Pounds common salt,
1 Pound sulphate of magnesia,
$\frac{1}{2}$ Pound sulphate of iron,
$\frac{1}{2}$ Pound powdered gentian.
Mix. |
|---------|--|

For good simple vermifuge for round and thread worms, to be given as a drench, take

- | | |
|---------|---|
| No. 13. | 4 Ounces linseed oil,
$\frac{1}{2}$ Ounce oil of turpentine,
Mix. |
|---------|---|

If the sheep are known to have tape worm, give in molasses and water the following :

- | | |
|---------|--|
| No. 14. | 2 to 4 Drachms powdered areca nut,
10 to 20 Drops oil of male-fern,
Mix. |
|---------|--|

The first quantities for small, and the latter for large sheep.

In the case of a large sheep, administer half a pint of linseed oil on the following day.

VII. The Rot or Liver Fluke.

Causes.—Small flat worms (*Fasciola Hepatica* and *Distomum Lanceolatum*) in the liver, called the liver fluke, are the cause of rot.

How to know it.—There will be tenderness and weakness about the loins; the belly will be swollen and enlarged; the eyes yellow as in jaundice; and if the skin be rubbed back and forth, when taken up between the thumb and fingers, it is soft and flabby, with a crackling sensation.

What to do.—If there is diarrhœa, a weak heart beat, and general stupor, remove the sheep to a high dry pasture, or to well ventilated airy places, as the case may be. Prepare the following:

- No. 15. $\frac{1}{2}$ Pound sulphate of magnesia,
6 Drachms oil of turpentine.

Mix the magnesia sulphate with three half pints of water, add the turpentine and give one-third of it every two days, shaking the bottle before using.

Follow the above with the tonic:

- No. 16. 40 Pounds oat meal,
4 Pounds powdered gentian or anise seed,
4 Pounds common salt,
1 Pound sulphate of iron,
Mix.

Give half a pint to each sheep once a day for a week: then wait three weeks and repeat. Remove the sheep to high dry pasture or salt marsh, both being poisonous to the fluke. Do not put the sheep in a wet pasture, for there they only sow the seed to perpetuate the trouble.



FASCIOLA
HEPATICA.



DISTOMUM LANCEOLATUM.

VIII. Lung Worms.

Causes.—This disease is caused by the presence of worms (*Strongylus Filaria*), which are usually found in the wind-pipe, and bronchial tubes and sometimes in the lungs.

How to know it.—There will be a husky cough; quickened breathing; loss of appetite and flesh; and the sheep will rub its nose on the ground; there may be dysentery with fœtid evacuations. Examine the mouth and throat, and also the stools, for indications of the worms. Prepare the following:

- No. 17. 6 Ounces sulphate of magnesia,
4 Ounces nitrate of potash,
4 Ounces sulphur,
4 Ounces sulphate of iron,
Mix.



STRONGYLUS FILARIA, MALE ENLARGED.

Give a single handful to each sheep in oat or corn meal once a day for a week ; then wait three weeks and repeat. Burn turpentine on pine shavings under their noses so as to make them breathe the fumes.

IX. Sheep worried by Dogs.

Sheep that have been torn by dogs, are apt to die, owing to the lacerated nature of the wound, especially if the skin has been stripped from considerable surface in hot weather.

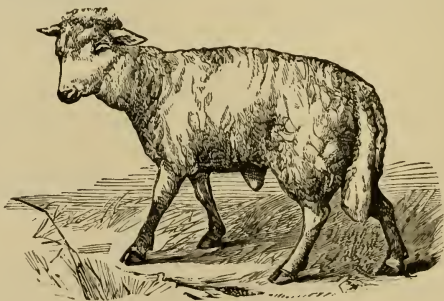
What to do.—The lacerated surfaces must be brought together, in such a way that they may unite ; and, if necessary, stitched. In hot weather flies must be guarded against, and the wounds should be treated as advised in the case of horses when wounded.

X. Sprains, Strains and Bruises.

What to do.—These also are to be treated precisely as advised in the case of horses. In simple cases hot fomentations and the subsequent application of camphor is the rule usually followed. For a sprain, to immerse the limb in water as hot as can be borne, for half an hour at a time, and repeated several times a day, usually effects a rapid cure.

XI. Care when Lambing.

What to do.—The ewes should be well fed for several weeks previous to lambing, so as to be strong and have the lambs strong and well developed when dropped ; but avoid having the ewes fat. Have a dry, comfortable place for them to run in, not too warm ; they should be put in a



SWELLING OF THE UMBILICUS IN CHARBON (NAVEL ILL.)

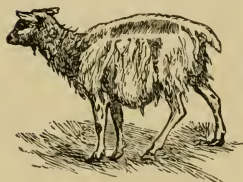
warmer place when lambing than they have been accustomed to, in order to avoid chilling the lamb. Allow no spectators around the sheep while lambing, except the man they are accustomed to ; let him watch the progress of events to see that help is given if needed.

Sometimes wrong presentations are made, and then the shepherd should be ready with his hand oiled and warmed in warm water to render assistance; let him insert his hand and change the position of the fœtus as the case requires, being very careful indeed not to wound or torture the ewe.

If the lamb is dropped at night and gets chilled, put it into a warm water bath and dry it thoroughly when taken out, and give it a few spoonfuls of milk, diluted a little and sweetened, and with a dusting of red pepper in it. Keep the ewe separate from the others for a week or ten days, and feed on soft food and roots if it is too early for grass.

XII. Navel Ill.

Charbonous fever, or carbuncular erysipelas in lambs, in addition to the other symptoms, usually manifests itself in swelling of the umbilicus. The swellings are not confined to the umbilical region, but are often found in other parts of the body. It is sometimes seen as a symptom or complication of rheumatic disease of the joints of lambs, foals and calves. It was considered by shepherds, not many years ago, to be a distinct disease, known as Navel Ill. See illustration



THE ROT.

on preceding page.

XIII. Bare-Lot Method of Raising Lambs to Avoid Nodule Disease.

A parasitic worm known to scientists as *Oesophagostoma columbianum* causes the appearance of nodules in the intestines of sheep. This worm is generally distributed throughout the United States, and becomes a serious scourge in the sheep business, especially when conditions are favorable for the infestation of young lambs. It has been shown by the Louisiana Experiment Station that when sheep infested by this parasite are placed on clean pasture and allowed to remain for some time the pasture becomes contaminated and will cause an infestation of healthy sheep which may subsequently graze upon it. It was also found that when an infested pasture was plowed up and cultivated for one season danger of infestation with the parasitic worm which causes nodule disease was entirely removed.

This indicates a successful method of treating infested land. On account of the wide distribution of this parasite, however, and the general infestation of breeding ewes, it was desirable to find a method by which lambs could be raised from these ewes without becoming seriously infested with the parasite.

What to do.—In order to accomplish this purpose a bare-lot system was adopted. This consists simply in keeping the ewes with their lambs on a plat of ground from which all grass or other green vegetation has been removed. The lambs, therefore, have no temptation to pick up anything from the ground and do not run the risk of infesting themselves with the nodule-producing parasites which may be upon the ground. In the experiments carried on at the Louisiana Station the ewes were fed grain once a day, and a rack was provided for feeding green forage of different kinds. All green forage which was pulled out of the rack by the sheep was carefully removed from the feed lot each day. Fresh water was always present in a wooden trough, and the feed lot was leveled so as to prevent the accumulation of water in pools from which lambs might drink. In this feed lot nine ewes were placed with six lambs, the lambs being born in February and March. At the end of June, all lambs being weaned, the ewes were slaughtered and all found to be infested with the parasitic worms. The lambs were slaughtered and carefully examined at ages varying from 88 to 155 days. In three of these lambs two or three nodules of minute size were found in the intestines. The others were entirely free from nodules, but all six of the lambs were infested to a greater or less extent with stomach worms. The infestation of stomach worms, however, was not sufficient to influence perceptibly the development and fattening of the lambs. It is difficult to understand how infestation with stomach worms took place. The bare-lot method appears, from these experiments, to give promise as a means of raising lambs for market at an early age from mothers infested with the nodule-producing parasite without danger of serious infestation of the lambs. It is recommended that in addition to maintaining the infested ewes with their lambs in a bare lot the lambs should be given some vermifuge with their food, or at least common salt, to assist in the removal of possible stomach worms.



TROUGH FOR DIPPING LAMBS FOR SHEEP SCAB.

BOOK V

PART I

POULTRY

HISTORY, MANAGEMENT AND CHARACTERISTICS
OF THE VARIOUS BREEDS



BLACK AND WHITE LANGSHANS

POULTRY.

CHAPTER I.

ORIGIN AND VARIETIES OF FARM BIRDS

I. ORIGIN OF THE WORD POULTRY.—II. TYPES AND NATIVE COUNTRY OF BARN-YARD FOWLS.—III. CHANGES DUE TO BREEDING.—IV. DIVISION OF FOWLS.—V. THE WILD TURKEY.—VI. DUCKS.—VII. GEESE.—VIII. THE SWAN.—IX. PHEASANTS.—X. GUINEA FOWLS.—XI. PEA-FOWLS.—XII. ANATOMY OF THE HEN.

I. Origin of the Word Poultry.

The word poultry comes from the Latin word *pullus*, a chicken, or the young of any animal. In its broad sense it is now used to designate any domestic fowl bred or fed for human food, and for the eggs and feathers. Hence, the peacock may reasonably be included, since its feathers are an important article of commerce. The modern word poultry, however, more properly comes from the French word *poule*, hen, just as our word pullet comes from the French *poulet*, a chick. The cut of the French Creve Cœur will illustrate a singular departure from the wild type given on the next page. In a more modern sense the word poultry is generally applied to barn-yard fowls or the genus *gallus*—the word fowl being used with a prefix, as water-fowl, which includes ducks and geese, Guinea-fowl, etc., while turkeys, peacocks, pheasants and other later or only partially domesticated birds are designated by their proper or common names.

II. Types and Native Country of Barn-Yard Fowls.

The originals of all the varieties of barn-yard fowls were inhabitants of thickets, and other openings of the forests, rather than of the dense forest itself; there are a number of species. A variety closely resembling our common barn yard fowl, is the Sonnerat fowl, (*Gallus Sonneratii*) a native of the Ghautes, separating Malabar from Coromandel. Damphier, previous to the discovery of Sonnerat, found wild fowls closely resembling our old barn-yard fowls in the islands of the Indian Archipelago. So it may safely be said, that our fowls with long flowing tails, are natives of India.

III. Changes Due to Breeding.

The great wild species of Southern Asia, and the wild Malay and Chit-tagong, were probably influential in modifying the large Asiatic breeds of to-day; and our bantams undoubtedly spring from the Bankiva jungle fowl, although careful and systematic breeding and selection have given us bantams of all the principal breeds of barn-yard fowls, including the games. Again, as showing a marked departure from the wild form, we



BEARDED SILVER POLISH HEN.

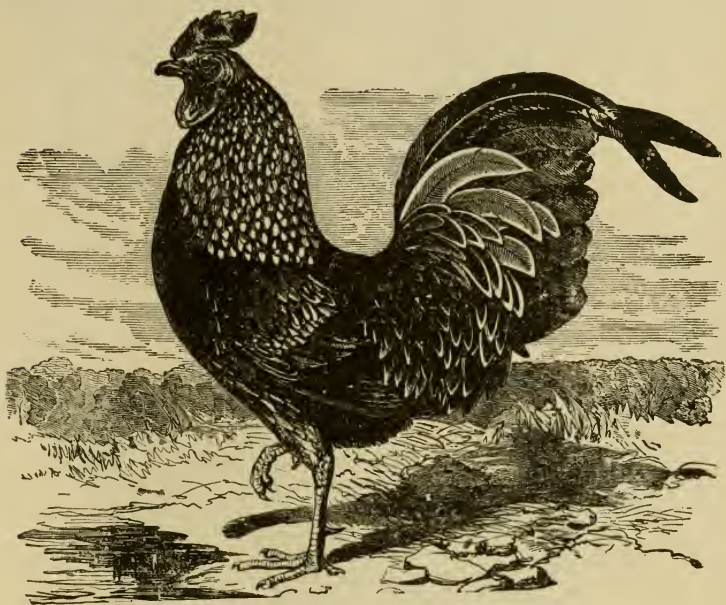
give cuts of two heads, one the Breda, or Gueldre, retaining the wattles, but not the marked comb, and a variety of Brahma, with no wattles, and with only the rudiments of a comb.

IV. Division of Fowls.

Our barn-yard fowls may therefore be divided into the common or mixed breeds, Asiatic fowls, European and American varieties, and Bantams. Each of these will be treated in their proper places.

V. The Wild Turkey.

The wild turkey is a native only of America; there are several so-called species, but they are, however, only varieties that have bred constant to type, perhaps having escaped from some ancient domestication. They are all fertile one with another. The turkey is native to all that region from Central America, north, up to 45 degrees, wherever suitable timber covert can be found; but in all the more thickly settled regions they have long since been exterminated. The illustrations show the common wild turkey hen, and the Mexican wild turkey cock.

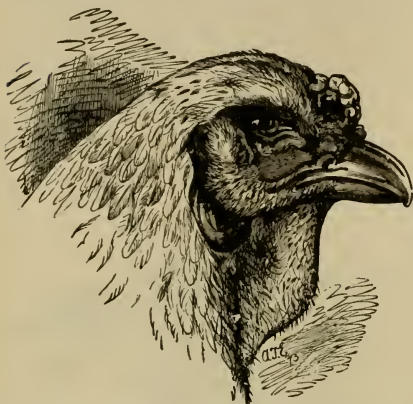


GALLUS SONNERATII.

VI. Ducks.

None of the wild fowl seem to have been more easily domesticated than the duck, though the domestication of birds of any species seems easy, whenever they prove valuable enough to pay their keeping. Only the larger varieties have, as a rule, been thought worth domestication, though of late years some of the smaller and beautifully plumaged birds have been bred in a tame state. They make very handsome adjuncts to water scenery, in connection with swans and the rarer species of geese.

The common white duck and the Rouen are two of the oldest domesticated varieties of ducks; while the Cayuga, or black duck, an American variety is among the latest.



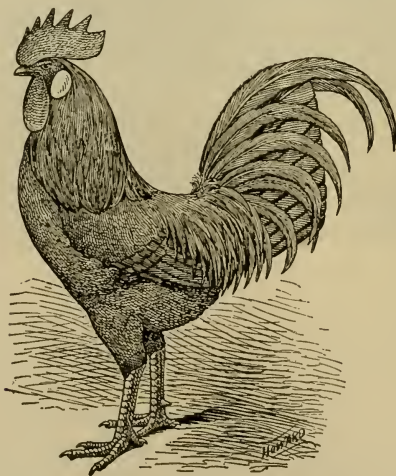
HEAD OF SINGLE WATTLED BRAHMA FOWL.



HEAD OF BREDA, OR GUELDRÉ.

VII. Geese.

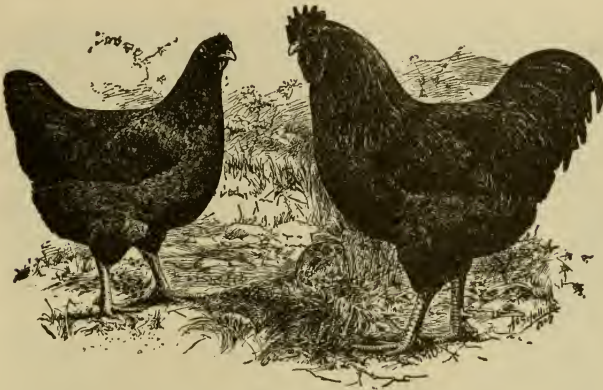
Geese, as well as ducks, being birds of passage, are found in all climates, from sub-tropical latitudes up to the Arctic Circle. Following the



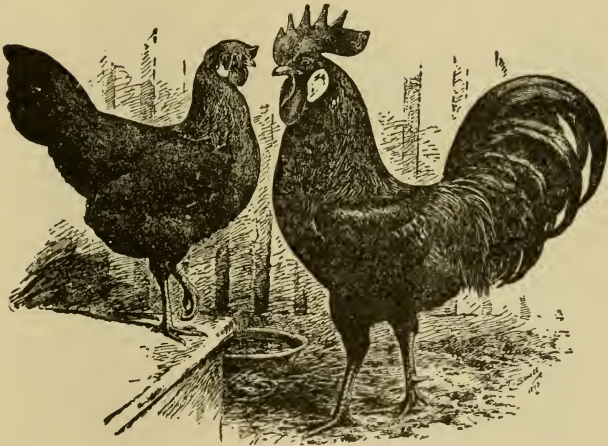
BUFF LEGHORN COCKEREL.

season of spring into the North, they breed in summer from latitude forty-five up to sixty, and return in the autumn to their winter quarters

in the sub-tropical regions. The common gray goose is the nearest ap-



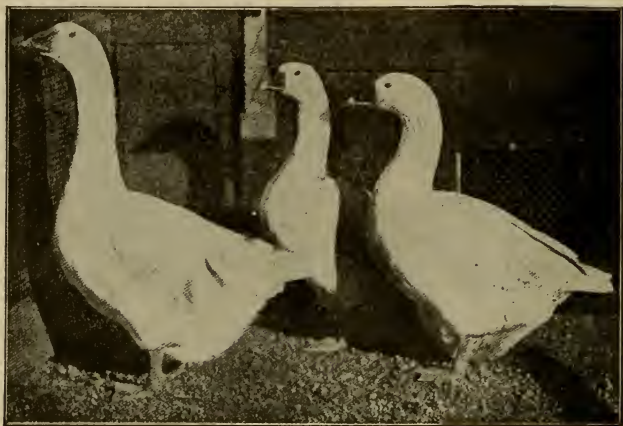
SINGLE COMB RHODE ISLAND REDS.



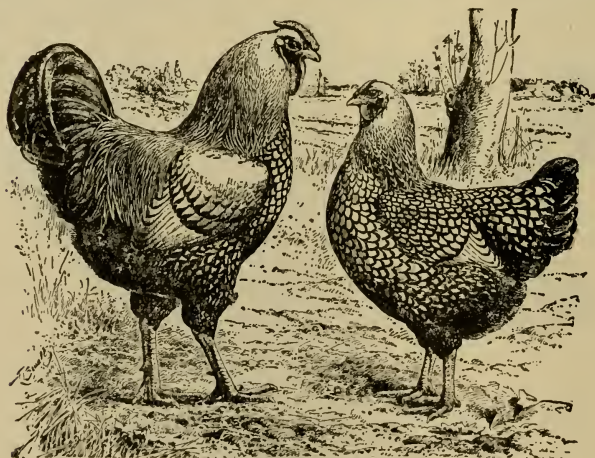
A PAIR OF SINGLE COMB BROWN LEGHORNS.

proach to the wild type, and these are becoming scarcer and scarcer each

year, gradually giving way to improved breeds. Of these, the Embden, or Bremex, combine a pure white color, softness of color, and heavy weight. The origin of the gray and the white geese is generally sup-



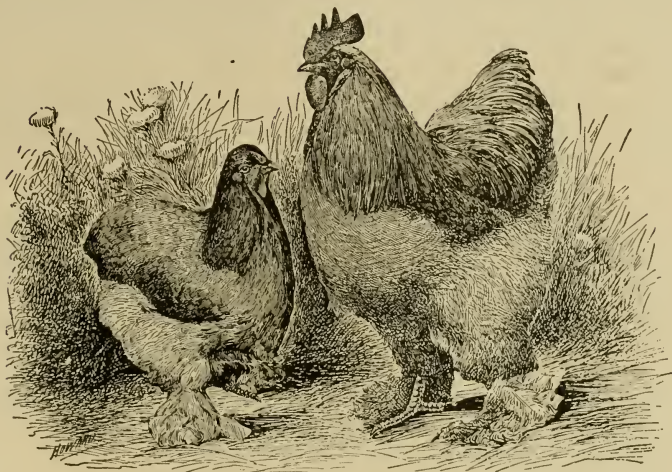
A TRIO OF EMBDEN GEESE.



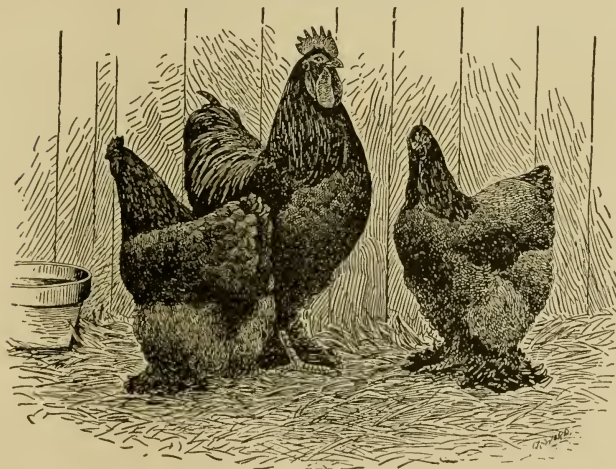
A PAIR OF SILVER-LACED WYANDOTTES.

posed to be the gray-lag goose (*Anser Fervus*), of the North of Europe. The American wild goose (*Anser Canadensis*), is a distinct species; this variety breeds freely, and is tolerably contented under domestication,

even in the first generation. It is but a few years, comparatively, since they were first domesticated. Asia and Africa have furnished us with



PAIR OF BUFF COCHINS.



TRIO OF BLACK COCHINS.

four sub-families of geese, three of which came from China, and the fourth from Africa—the African goose.

VIII. The Swan.

The swan has long been known in history, but is not a useful bird except as an ornamental appendage to the ponds and lakes of parks. The most common is the white swan; there are, besides, a number of rare and ornamental varieties, among them the black swan from Australia, and the black-necked Chili swan. The head and neck of the latter are jet black; the body, wings, and tail, pure white, the bill having a red knob or protuberance.

IX. Pheasants.

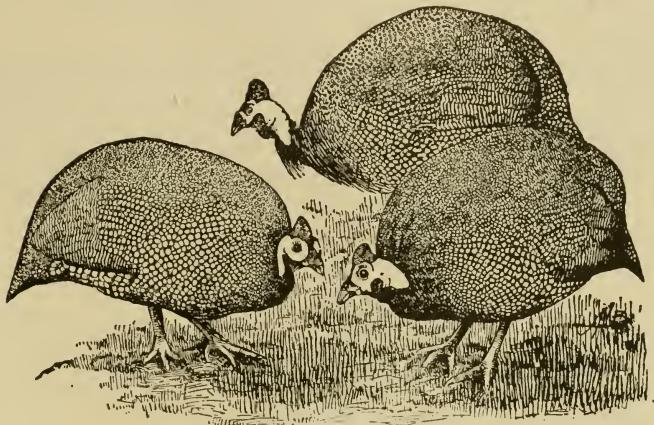
None of the pheasants (*Phasianus*) are natives of the United States, the so-called pheasant of the South and some other sections of the United States being really the ruffed grouse (*Tetrao umbellus*). The common half-domesticated pheasant of Europe and America (*Phasianus Colchicus*) is found wild in the Caucasus, and about the Caspian Sea. In the United States we have five varieties which breed in confinement, but none of them are more capable of domestication than the peacock. These varieties are: The ring-necked, originally from China; the ash-colored; the white; and the parti-colored.

The ring-necked pheasant is said to be originally from China. The male of the silver pheasant (*Phasianus nycthemerus*) originally from the north of China, is a most beautiful bird, of a silver white color, with regular, slender, lace-like black markings on the feathers of the back, while the under parts are of a black color; the long, drooping tail is also silver white, barred with black. The female is of a dull reddish color, and of a smaller size. The golden pheasant (*Phasianus thaumalea pictus*) is one of the most beautiful of birds, bred in a state of half-domestication, and is much smaller than either of the pheasants before mentioned. The under part of the male is of a red color, the head is ornamented with a splendid golden yellow crest, the neck is hidden or overhung by a somewhat projecting ruff of feathers of a bright yellow color, striped or barred with black. The wings are of a dull blue, the hind parts of the body are of a golden color, set off with red, and the tail is long and brown, barred with black. The female of this species is also inconspicuous in color.

These birds have bred well in some forests in Europe, and in a state of domestication have produced three varieties, viz: the ordinary golden and red color, the black, and the Isabella or fawn. They all, like the Guinea-fowl and peafowl, roost on high trees and elevated points, and wander considerably; but in close confinement they will permit handling.

X. Guinea-Fowls.

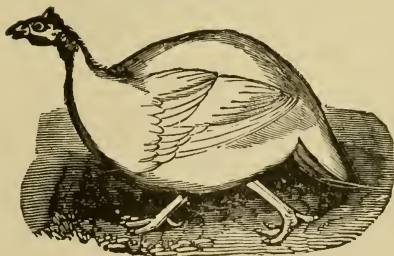
Guinea fowls are of two varieties and are now quite widely disseminated. The varieties are, the pearl and the white, the latter yet rather rare. They have been grouped by naturalists into a number of varieties,



A TRIO OF GUINEAS.

but the distinction was more fanciful than real, since all the varieties readily mate one with the other, and the progeny are continuously fertile together.

Their original home may be inferred from their generic name, *Numida*; they come from Numidia and other portions of Africa from Gam-



WHITE GUINEA-FOWL.

bia to the Gaboon. The so called Cape Verde and Jamaica Guinea-fowls are undoubtedly descendants of these, become wild after having been carried there. The cuts of the white and speckled species will give a

good idea of the whole tribe. A very rare species is the Vulturine Guinea-fowl, so called for its vulture-like head and neck. The whole species are among the most watchful and wary of birds, giving instant alarm with their shrill note of danger. When bred, they should be allowed full liberty, since they do not stand confinement well.

XI. Peafowls.

This magnificent bird, quite useless except for the splendor of its plumage and the value of its tail feathers, is rare in farm yards, from its supposed want of adaptation to northern climates. This, however, is a mistake; they are as hardy as most of the breeds of barn-yard fowls. The male is cruel and cowardly, and is given to destroying the eggs of the



PEACOCK.

female. Hence the hens are very secret as to their nests. They do not lay their eggs until late in the season, and keep their broods away from the yards until driven thither in the autumn for want of food. They have considerable powers of flight, and the males, especially, wander long distances from home; they should be allowed their full liberty.

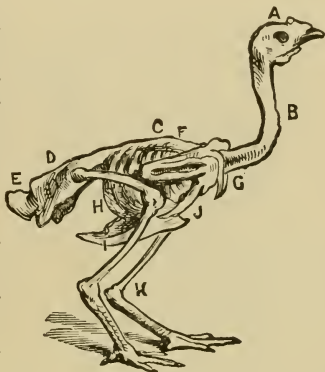
XII. Anatomy of the Hen.

The anatomy of the hen will answer for all the land birds, and, in a measure (for all but the scientific breeder) for water-fowls as well, since the frame of the latter is only so modified as to permit their swimming and diving in water. Both in land and water-fowls the more valuable

portions for food are the breast, the thigh, the leg, the neck and the wing. The back and rump give but little flesh, very choice in flavor.

Fig. 1 represents the skeleton of a hen of average size and in the proportions as ordinarily met with.

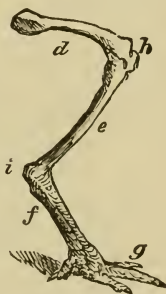
Explanation.—*A*—The head, length 2 3-4 inches. *B*—The neck, length 5 1-3 inches. *C*—The back or spine. *D*—The hips or hip bones, (the back and hips comprise from the shoulder to the tail,) length 5 9-10 inches. *E*—Rump or coccygis, length, 1 1-2 inches. *F*—Shoulder-blade or shoulder. *G*—Collar bone or ‘merry-thought.’ *H*—Chest or thorax, composed of the sides and breast-bone (bone of the throat); it contains the heart, liver, etc. *I*—The breast-bone, length a little over 3 1-2 inches. *J*—The wing bones, as will be seen, are composed of the humerus or shoulder-bone of the wing, length 3 1-7 inches; also the radius and the cubitus, the forearm or pinion, length 2 3-4 inches; the tip of the wing, or that which takes the place of the hand and fingers, length 2 1-3 inches. *K*—



ANATOMY OF THE HEN. (Fig 1).

The leg, composed of *d*— (Fig. 2.) the thigh bone, length 3 1-7 inches; *e*—the shin bone, length 4 1-3 inches; *f*—the bone of the foot, the tarsus, length 3 1-7 inches; *g*—the claws, that of the middle, length 2 1-3 inches; the two to the right and left, length 1 6-10 inches; that of the back, length 8-10 inches; *h*—the patella or knee; *i*—the os calcis or heel.

The foot as shown in Fig. 2, is all that part (*f*) from (*g*) to (*i*). The hen—like nearly all four-footed animals, and unlike man—walks on the toes. If the hen walked on the foot, all that portion from the toe nails up to *i*, would rest on the ground, and hence the position of the rear toe would be different. As it is placed, it supports the other toes in walking and especially when on the perch, at night; for all land breeds are peculiar in this, that when they are at rest, they retain their position securely by the simple weight of the body, which causes the sinews and muscles to contract and thus draw the toes firmly around the object grasped. Some fowls have five, and even six toes, but four only are used to advantage—three before and one behind. The rest are really super-numerary—as much so as two thumbs on a man's hand



(Fig. 2).

CHAPTER II.

BARN-YARD FOWLS.

- I. ENGLISH BREEDS—DORKING FOWLS.—II. SILVER GRAY DORKINGS.—III. GRAY DORKINGS.—IV. FAWN-COLORED DORKINGS.—V. BLACK DORKINGS.—VI. BOLTON GRAYS, OR CREOLES.—VII. FRENCH FOWLS—HOUDANS.—VIII. LA FLECHE FOWLS.—IX. CREVE CŒURS.—X. BREDA OR GUELDER FOWLS.—XI. SPANISH FOWLS.—XII. HAMBURG FOWLS—BLACK HAMBURG.—XIII. PENCILED HAMBURGS.—XIV. LEGHORN FOWLS.—XV. WHITE LEGHORNS.—XVI. AMERICAN BREEDS.—XVII. DOMINIQUE FOWLS.—XVIII. OSTRICH FOWLS.—XIX. PLYMOUTH ROCK FOWLS.

I. English Breeds—Dorking Fowls.

Of the distinct English breeds of barn yard fowls, the Dorkings, in their varieties, confessedly stand first. The old White or Surrey Dorking is the original type from which the others have sprung. The Dorkings all have five toes, are full wattled, with long sickle-shaped tail feathers and generally single serrated combs. The White Dorkings are plump, compact birds with strong head and bill. The plumage is pure white without spot, and the legs, also, are white. The mature cock will weigh fully ten pounds, the hen eight or nine pounds, and year-old birds eight or nine pounds when fat. They are fairly hardy, good layers, careful and watchful of the brood; and the flesh is most excellent. None of the Dorkings can stand cold storms; but they are altogether the best of the distinct English breeds.

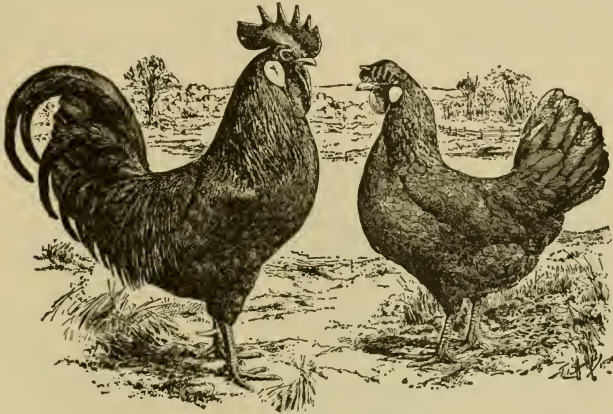
II. Silver-Gray Dorkings.

The Silver-gray Dorking is undoubtedly a chance variety of the White Dorking, which has been continued by careful breeding and selection. They vary much in their markings, unless the greatest care is used, and even then many chicks must be discarded from the breeding yards. Their mixed origin is fully shown in the fact that dark colored birds often produce handsome silver-gray chicks.

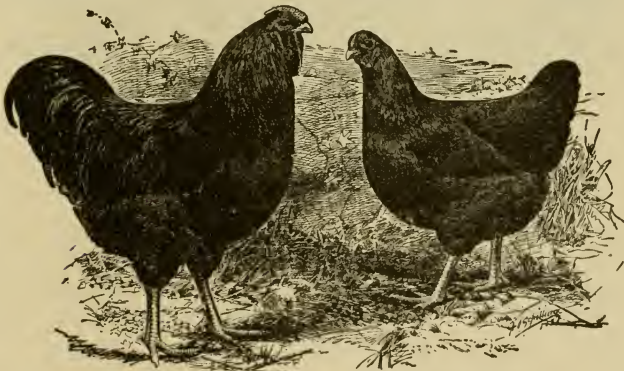
III. Gray Dorking.

The distinguishing colors of this variety are: Breast, tail and larger tail feathers perfectly black; the head, neck, hackle, back, saddle, and wing bow a clear, pure, silvery white; and across the wings a well defined black bar, in striking contrast with the white outside web of the

quill feathers and the white hackle of the neck and saddle. The neck of the hen is silvery white; the breast salmon red, changing to gray near the thighs; the wings silvery or slaty gray, without any tinge of red; the tail dark red, the inside nearly black. The chicks grow rapidly, if well fed, so that they may be made ready for broiling before they are fully fattened.



A PAIR OF BUFF LEGHORNS.



A PAIR OF ROSE COMB RHODE ISLAND REDS.

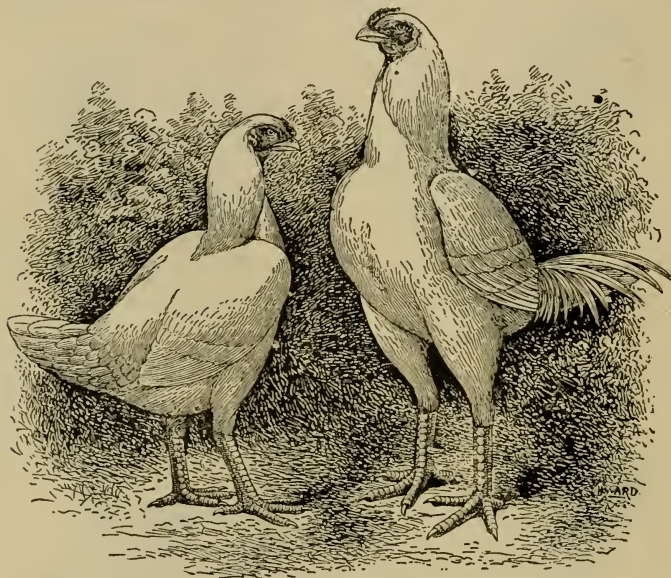
IV. Fawn-Colored Dorkings.

Birds of this variety are handsome, but with tails shorter than the others; they have black legs and a high carriage. The hens lay large eggs. The matured cocks will weigh up to nine pounds and the hens seven

pounds of excellent flesh. They are said to have been produced by a cross between the White Dorkings and the fawn-colored Turkish fowl.

V. Black Dorkings.

The black Dorkings differ but little from the other varieties. They are, however, thought to be more hardy than the other sub-families; the hens are good layers and careful nurses, and the eggs are large. According to Wright, the pure-breds are jet black; the neck of some cocks tinged



PAIR OF WHITE INDIAN GAMES.

with gold, and the hens silver tinged; the comb usually double, short, sometimes cupped, but sometimes single; the wattles small; the tail feathers shorter and broader than those of the White Dorking; the legs black, short, and with the two under toes separate and distinct.

VI. Bolton Grays or Creoles.

This breed, once famous in England, was said to have been bred with such nicety that individual fowls could scarcely be distinguished one from another. They are great layers ; not inclined to set ; short-legged ; plump ; medium-sized ; the eggs, however, rather small ; the color is white, thickly spotted with black as to the neck and body, with black bars at the extremity of the tail.

VII. French Fowls—Houdans.

The four varieties of French fowls that have been more or less disseminated in the United States are the Houdans, the Creve Cœur, La Fleche, and the Breda.

The Houdans rank in France with the Dorkings in England, and in the United States they are regarded with favor. They are said to have been originated from a cross between the Dorking and the silver Padoue, and have the fifth toe as do the Dorkings. In color they should be white

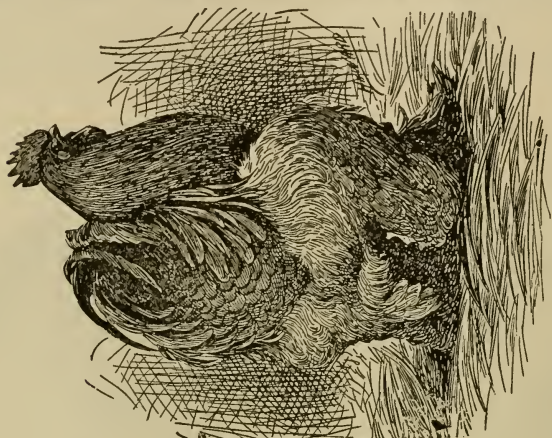


BLACK JAVAS.

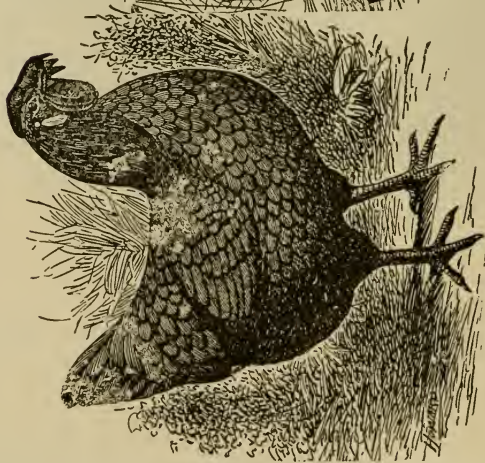
and black, evenly distributed, making them distinctly speckled. Red feathers are not admissible, but an occasional stained feather is sometimes seen in the best fowls. They love to wander, but bear confinement well. The comb is double leafed, and they have whiskers and beard growing well up on the face which, with the crest or top-knot, gives them a curious appearance. The crest of the hen is quite thick, rounded and full. They are hardy, fatter kindly, lay good-sized eggs, and the flesh is of the first quality.

VIII. La Fleche Fowls.

These are hardy ; tall, rather angular, but compact-bodied ; jet black ; strong-limbed, with dense, firm plumage. They lay excellent eggs, and the flesh is superior to that of any other French breed, and excelled probably by none. They are a full wattled fowl, and the protuberant



BACK VIEW OF BUFF COCHIN COCK.

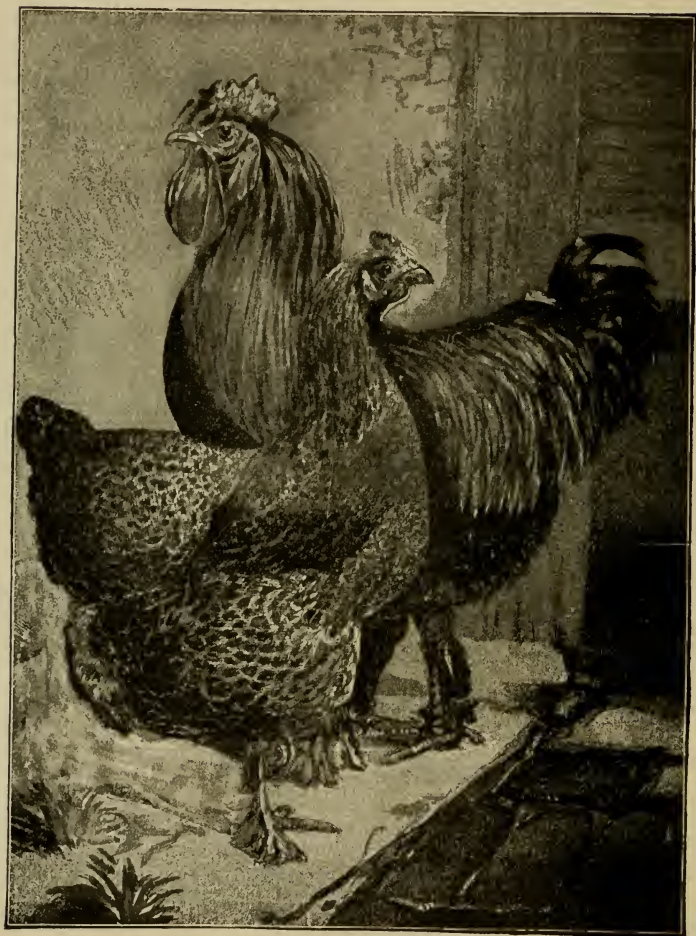


BLUE ANDALUSIAN HEN.

feathers behind the serrate comb give them the appearance of being double horned. Their ears are large and opaque. The beak moderately curved, neck hackles long and fine, reflecting violet and green-black colors, as do the breast, wings and upper tail feathers. The legs are



BLACK BREASTED RED GAMES.

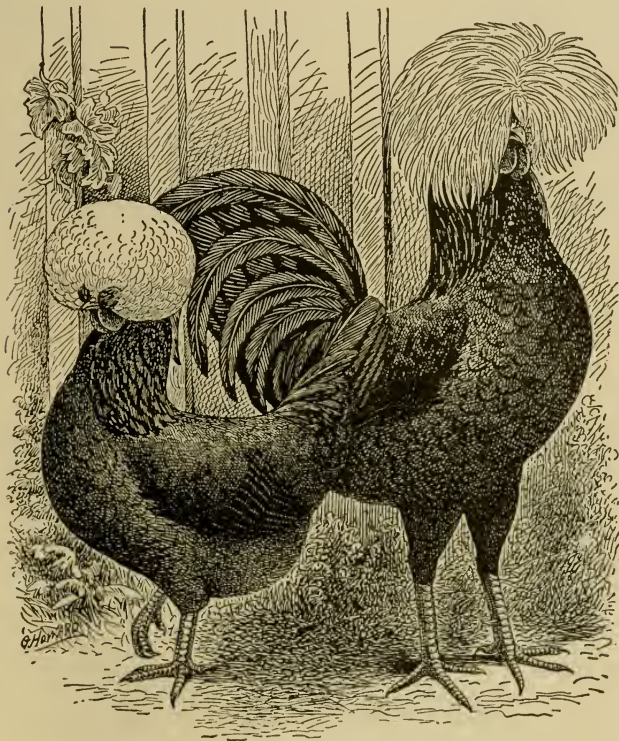


PARTRIDGE COCHINS.

long, slate-blue in young fowls, and a lead-gray when old. The hen is colored like the cock. The cocks are fully mature at a year and a half old and the hens at twelve months.

IX. Creve Cœurs.

The Creve Cœurs are among the most elegant and stately of French fowls. Their color is black, reflected with a glistening greenish hue ;



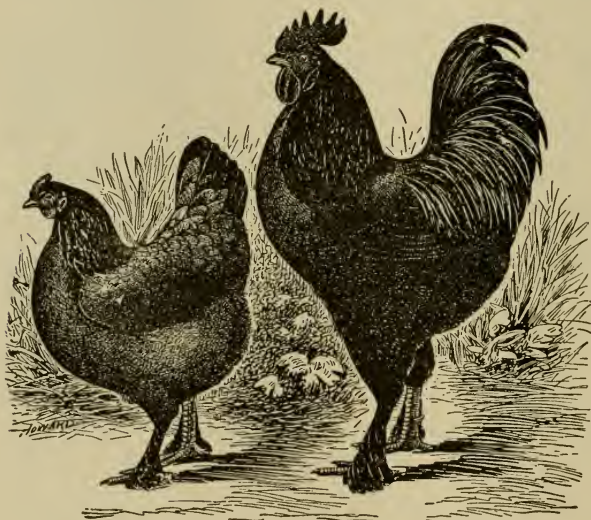
PAIR OF WHITE-CRESTED BLACK POLISH FOWLS.

their antler-like, deep crimson combs and crested heads give them a bold, striking and dignified appearance. They are, also, probably the most useful of the French breeds, when we take into consideration their good feeding qualities, their great merit as steady producers of large

eggs, their easy fattening qualities, and their constitutional hardiness. Their color should be jet black, though as age approaches an occasional white feather may appear in the crest. They are short-legged, compact fowls, with little offal, and of the non-sitting order—so much so that the eggs should be placed under other hens, or those more apt to be reliable as sitters and nurses. In England they are reputed somewhat tender, but in the United States we have heard no complaints of this kind, after they were once acclimated. The heads of the cocks are topped with handsome crests, before which are seen large, toothed, two-horned combs. Their wattles are handsome and pendent, and they have dense cravats of feathers on the fore part of the neck. The illustration admirably shows their chief characteristics.

X. Breda or Gueldre Fowls.

These fowls are called after the French province of the same name, where the breed originated; but though they are classed as French fowls they evidently show an infusion of Asiatic blood, while they are Polish



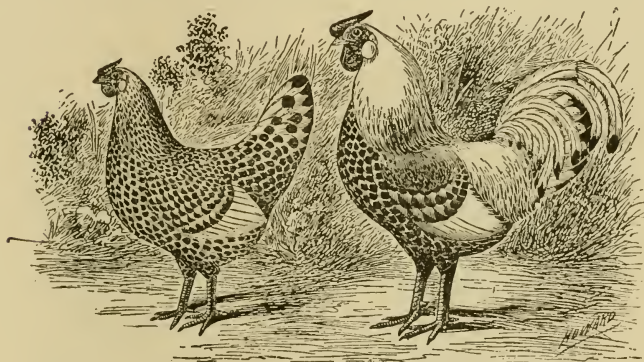
PAIR OF BLACK LANGSHANS.

in shape and undoubtedly closely allied to that breed. There are several such varieties distinguished by color—the cuckoo-marked being called Gueldres, and the black, Bredas, though the latter term seems to be applied to all that are not cuckoo or dominique marked.

They have just a perceptible crest, pendent wattles, and very little comb. Whatever the color, they have but few feathers on the legs, which are slaty blue, and the thighs vulture hooked. The plumage is close and compact, the ear lobes and wattles bright red and peculiar in shape. The chicks are hardy and feather quickly, and the eggs are large, smooth and excellent in flavor. Two peculiarities of this breed are the almost total absence of comb, causing a depression in that part, and their cavernous and conspicuous nostrils. The accompanying illustration, together with the cut of head on a previous page, will sufficiently portray their distinguishing characteristics.

XI. Spanish Fowls.

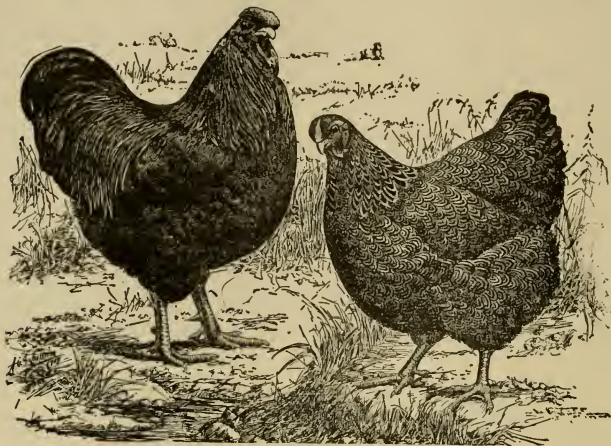
There are a number of Spanish varieties besides the Pure Black and the Pure White, as the Minorca or Red-faced Black, the Ancona, the Gray or mottled, and the Andalusian or Blue Spanish. They have long been valued in the United States for their great laying and non-sitting



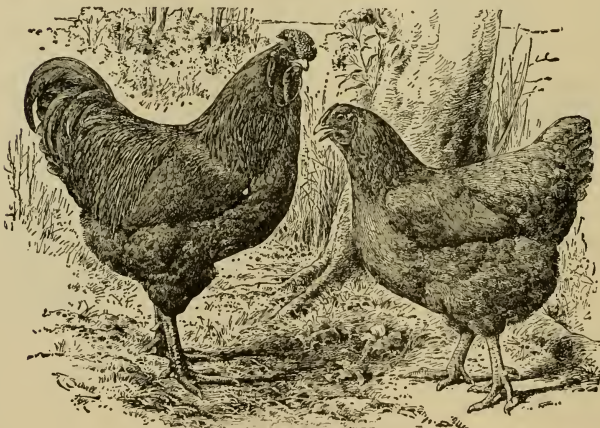
PAIR OF SILVER-SPANGLED HAMBURGS.

qualities, but are too tender to stand a northern climate, without extra protection, and they do not do well anywhere, when exposed to wet. With proper attention, the fancier may get good returns in large, meaty, well-flavored eggs, and plenty of them. To the average farmer they are not a valuable breed.

The characteristics of the two principal varieties are sufficiently well portrayed by the illustration in connection with the following description: The weight of a full-grown Spanish cock should not be less than seven



A PAIR OF PARTRIDGE WYANDOTTES.



A PAIR OF BUFF WYANDOTTES.

pounds, nor its height, when erect, less than twenty-two inches. The color should be pure black, or pure white, according to the variety, without white in the black or black feathers in the white variety. The eye should be full, bright and of a dark brown color. The ear lobes and

white face are important characteristics; the comb of the cocks high, firm, single and deeply serrated, while in the hens it will often fall over on one side; the wattles large, long, and of the deepest vermilion color, as is also the comb.

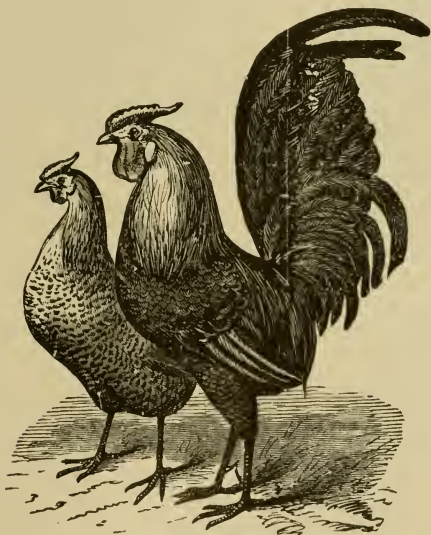
XII. Hamburg Fowls—Black Hamburg.

All the Hamburg fowls have these constant characteristics: Bright, double combs, firmly fixed, and ending in a long point behind and somewhat turned up; medium size; upright carriage; long upright tails, and long flowing plume feathers. They are hardy and robust, great layers of excellent flavored eggs, but seldom sit, even when they have a free range, and almost never when kept confined.

The black Hamburg is one of the best of fowls for farms where free range can be had and plenty of eggs are desired. They will lay even in the coldest weather if given warm quarters and warm food. The eggs are not large, but they make up in quality what they lack in size. The plumage should be deep black, relieved with a metallic lustre.

XIII. Penciled Hamburgs.

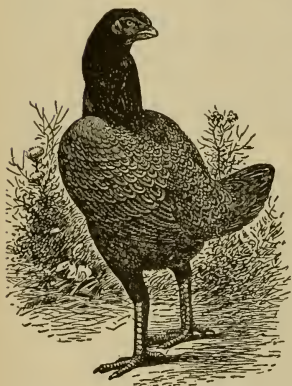
There are two varieties,—viz., Golden and Silver penciled, as there are two varieties of Spangled Hamburgs, the Golden and the Silver. In fact,



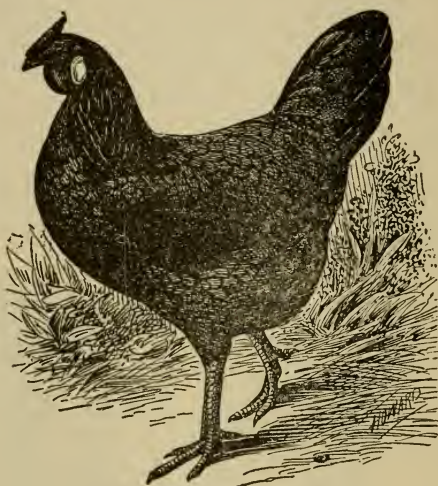
GOLDEN PENCILED HAMBURGS.

the Silver penciled variety are probably but little different from the old Bolton Gray, previously described, and descended probably direct from

the Turkish fowl described long ago by Aldrovandus. Tegetmeier says of them, that perhaps no variety of fowl ever rejoiced in more synonyms than this very pretty, and, in suitable situations, profitable breed; they have been long termed *Bolton Grays*, from being extensively and successfully cultivated in and about Bolton, in Lancashire; *Creoles*, from the intermixture of the black and white in their plumage; *Creels*, which is a provincial mode of pronouncing Creoles; *Corals*, because the numerous points of their polished, bright scarlet rose combs bear no distant resemblance to red coral; *Penciled Dutch*, because many are imported from Holland; *Dutch Every-day Layers* and *Everlastings*, for the same rea-



CORNISH INDIAN GAME HEN.



BLACK HAMBURG HEN.

son, and their great productiveness as layers; and *Chitteprats*, the derivation of which is not so obvious. Chitteface, according to Bailey, the lexicographer, means a meagre child; and *Chitteprat*, if intended to describe a diminutive hen, would not be misapplied to one of this variety.

The general characters of Penciled Hamburgs may be thus stated: They are birds of small size, compact and neat in form, sprightly and cheerful in carriage: In the plumage on the body of the hens, each feather (with the exception of those of the neck-hackle, which should be perfectly free from dark marks) is penciled with several transverse bars of black on a clear ground, which is white in the silver, and a rich bay in the golden birds. These pencilings have given rise to the name of the

variety. In the cocks, however, there is a general absence of these markings, the birds being either white or bay. In both sexes the legs are blue, with fine bone. The comb is a rose, square in front and well peaked behind; the ear-lobe a well-defined white; the face scarlet.

In weight and size, Silver-penciled Hamburgs are considerably below the general standard; the carriage of the cock is very erect; the tail is well borne up, and the head occasionally thrown back so far that the neck often touches the tail; the general form is exceedingly neat and elegant. In the hen the carriage is sprightly and active, but not so impudent as that of the cock; both sexes are alike noisy and restless in their habits, neat and very pretty in their form. The neck-hackle in both should be pure white; penciling with black, a very frequent fault in the hackle of the hens, being very objectionable. The saddle of the cock must be pure mealy white. The cock's tail is black, the sickle and side sickle-feathers being glossed with green, and having a narrow white edging. In the hens the tail must be distinctly barred or penciled with black.

The breast and thighs of the cock are white, as are the upper wing-coverts or shoulder, but the lower wing-coverts are marked with black on the inner web, showing a line of dots across the wing, forming a bar. The secondary quills, or those flight-feathers which are alone visible when the wing is closed, are white on the outer web and blackish on the inner web, and have a rich green-glossed black spot at the end of each feather. In the hens the entire plumage of the body, namely, that of the breast, back, wings, and thighs, should have each feather distinctly penciled or marked across with transverse bars of black; the more defined these are the better, as there should be a perfect freedom from a mossy appearance, which is caused by the two colors running into one another. The legs and feet in both sexes should be of a clear leaden or slaty blue. The comb in the cock is evenly set on the head, square in front, well sprigged above with small, even points, not hollowed on the upper surface, and terminating in a single flattened pike behind, which inclines slightly upwards. In the hen the comb is the same in form but very much smaller. The ear-lobe in both sexes must be a dead opaque white, free from red on the edge.

The hens of either variety must have the body distinctly and definitely penciled, and the hackles of either sex must be entirely free from dark markings. In the spangled varieties the markings must be distinct, like spangles, or speckled. The other characteristics range uniform with those of the other varieties. Whatever the variety, they are most valuable either to the farmer or fancier, but with the farmer, unless he be a fancier as well, if a little off color in breeding it is no detriment, so far as egg-laying is concerned.

XIV. Leghorn Fowls.

The Leghorn fowls are of the Spanish type, except in color. The White Leghorn is regarded with most favor, although the Brown Leghorn has its fanciers. There are also other grades of colors except black.



SINGLE-COMB BROWN LEGHORN COCK.

Whatever the color, they have all the good laying qualities of the Spanish, without their tender qualities, and indeed dispute the palm with the Hamburgs in every good point. The illustration shows what are accepted among breeders as standard White Leghorns.

XV. White Leghorns.

These birds are among the most elegant of barn-yard fowls, either in the yard of the farmer or amateur. They are similar to the Spanish in appearance, except that the plumage is white, with hackle or neck, and the saddle or rump feathers tinged golden. Unlike the Spanish, they are hardy, standing even our western winters excellently. They are good winter layers, and seldom desire to sit; the young early take care of

themselves, and feather so early that they look to be miniature fowls when six weeks or two months old. They are quiet and docile. The eggs are superior in flavor, and as a table fowl they have few superiors among the gallinaceous tribe.



BLACK MINORCA COCKEREL.

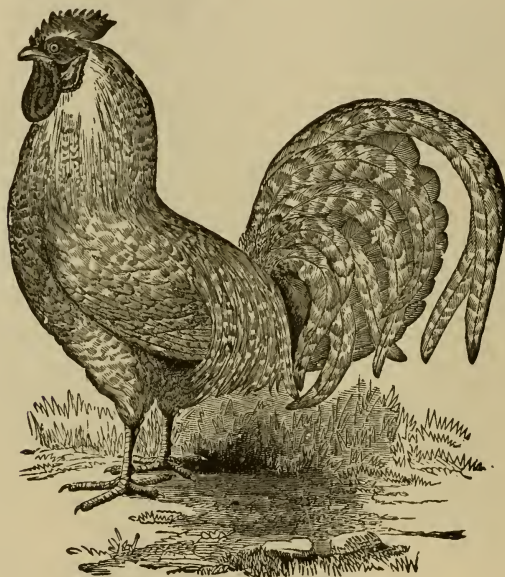
XVI. American Breeds.

The distinctive American breeds of barn-yard fowls that have attained wide celebrity are the Dominique, the Ostrich fowl, and the Plymouth Rock. The Dominique have often been confounded with the Scotch Grays, and also with the Cuckoo Dorkings and other fowls bred to the

cuckoo feather of England and France ; they are, however, an old and entirely distinct American race. The Georgian Game is also a distinct American breed, but this will be treated of under the head of Games.

XVII. Dominique Fowls.

For the farm-yard, when both eggs and chickens are desired, this breed when pure, (unfortunately now rather rare), is one of the most valuable of the known breeds, for it combines hardness of constitution with good foraging qualities ; is prolific of eggs, and when killed shows plenty of good flesh. The true color is a soft and undulating shading of slaty blue, upon a light ground all over the body, thus forming bands of various



DOMINIQUE FOWL.

narrow widths, and finely penciled among the smaller feathers. The cocks have heavy hackle and saddle feathers. The feet and legs must be bright yellow or buff, and the bill of the same color. The combs of the cocks, however, are variable, some cocks having a single and others a double comb.



BLACK SPANISH.



SILVER SPANGLED HAMBURGS.

XVIII. Ostrich Fowls.

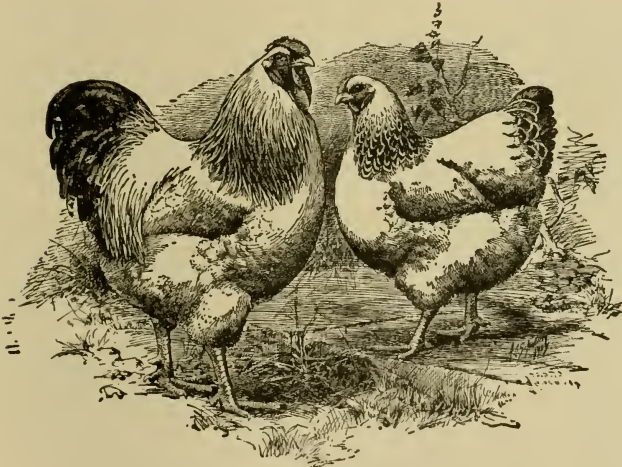
This breed is not widely disseminated, but in their native region—Bucks County, Pa.—they are highly esteemed for their weight, valuable laying qualities, excellent flesh, and hardy constitutions. The cocks will weigh nine pounds at maturity and the hens seven to eight, and will often lay forty to fifty eggs before wanting to sit. The color of the cock is blue-black, the ends of the feathers tipped with white. The wings a golden or yellow tinge, the hackle dark glossy blue. The cocks have a double rose-colored comb, and large wattles. The legs are short and strong, and the body thick and plump. The hens are marked similarly to the cock, but more soberly, and the comb is single, high and serrated.



OSTRICH FOWLS.

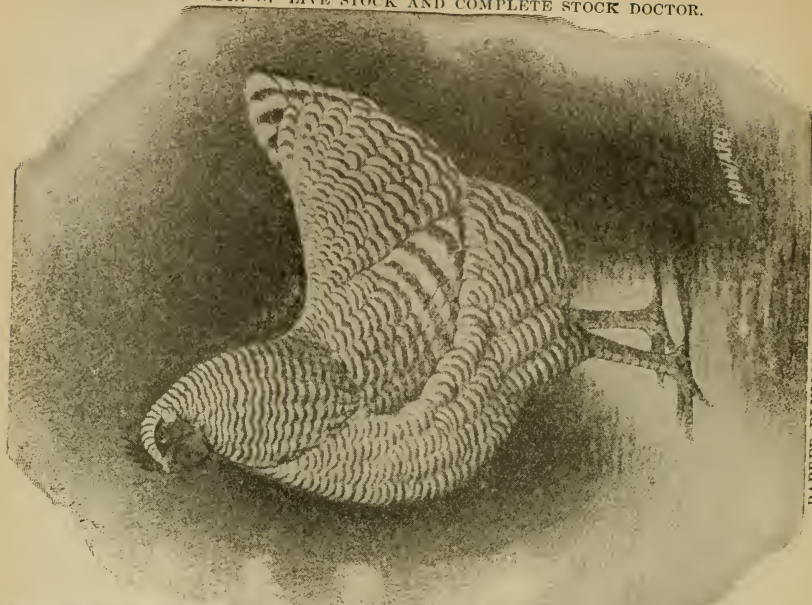
XIX. Plymouth Rock Fowls.

This is one of the latest-formed of American breeds, first shown at

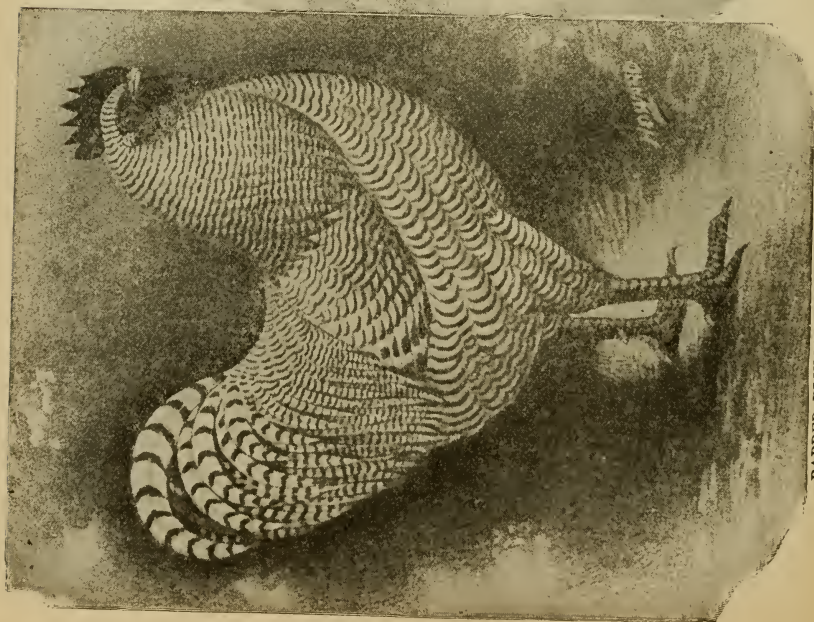


A PAIR OF COLUMBIAN WYANDOTTES.

Boston in 1840. It is evidently a breed made up of various crosses, and

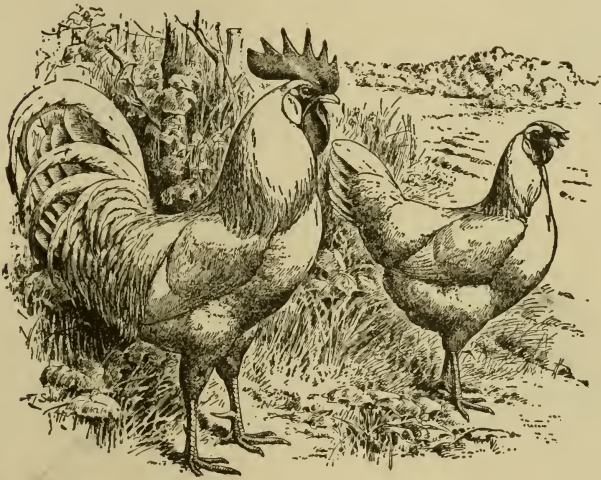


BARRED PLYMOUTH ROCK, FEMALE.



BARRED PLYMOUTH ROCK, MALE.

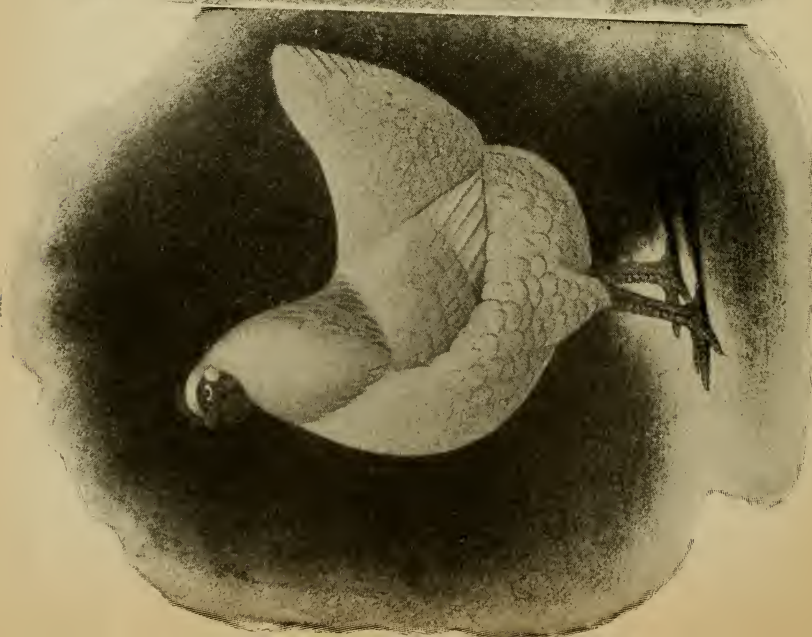
unfortunately was disseminated before its characteristics became uniform or well fixed in any respect. It gave rise to much bitter controversy, in which even the common dunghill was stated to have had a large share in the origin. Of late years, what is called the Improved Plymouth Rock has appeared and shows care and uniform breeding. They are said to grow fast, fledge early, take on flesh rapidly, and to combine excellent qualities as egg producers and as table fowls. They have not yet become popular, except with a comparatively few fanciers, and for the reason, perhaps, that their really good qualities are not yet known among farmers.



▲ PAIR OF SINGLE-COMB WHITE LEGHORNS.



WHITE PLYMOUTH ROCK, MALE.



WHITE PLYMOUTH ROCK, FEMALE.

CHAPTER III.

GAME FOWLS AND OTHER RARE BREEDS.

- I. GAME FOWLS AND THEIR VARIETIES.—II. EARL DERRY GAMES.—III. BROWN-BREASTED RED GAMES.—IV. DUCK-WINGED GAMES.—V. WHITE GEORGIAN GAMES.—VI. GAME BANTAMS.—VII. OTHER BANTAMS.—VIII. THE SEA-BRIGHT BANTAM.—IX. JAPANESE BANTAMS.—X. FRIZZLED FOWLS.—XI. RUMPLESS FOWLS.—XII. SILKY FOWLS.

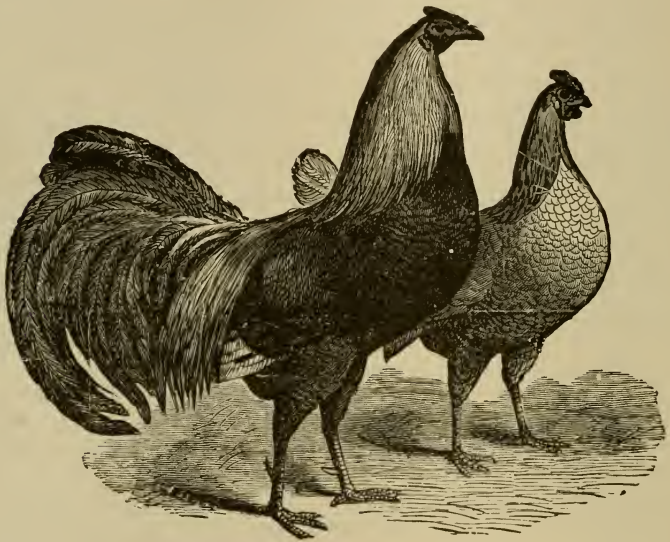
I. Game Fowls and their Varieties.

The Games are the most elegant as they are the noblest of the gallinaceous tribe. Watchful, without fear, attacking an enemy—even intruding dogs—with boldness, and fighting to the death, they at the same time are hardy, good foragers, and the hens produce eggs of the finest flavor. In fact, many fanciers breed them simply for the excellence of their eggs and the delicacy of their flesh. Public sentiment is justly against the barbarous practices of the cock-pit, in which birds are pitted against each other until one or both are killed. The varieties are numerous, and the sub-varieties are many, each having a local celebrity. As mere fighting birds, the English, Irish, Cubans, Mexicans, Spanish and Malays all have their favorites, while in many sections of the South the Georgian Games are held to be superior in point of shape, carriage, plumage, hardiness and courage, as they undoubtedly are superior in point of flesh, and the quality of the eggs. Among sub-varieties that have acquired more or less celebrity, the Salmon-pile Games, and the Dominique or Cuckoo Games may be noticed as combining many excellent qualities. Whatever breed is selected, but one variety can be kept in a run, since it would give rise to endless battles and killing of birds; besides, of all gallinaceous birds, the breeder of games should carefully keep them from intermixture.

II. Earl Derby Game.

This most excellent strain of game fowls is really the Black-Breasted red Game, but bred with the greatest care and attention for over a century in England. They are unsurpassed in style, beauty and courage, and for the table are among the best. As bred in England and in this country they are identical; they are described as having a round, well knit body, on long, strong legs, with white feet and claws; the head long, the bill lance-shaped and elegant; the face bright red, with small

comb and wattles red; they are daw-eyed, that is, the eye is gray like that of the Jackdaw; back intense brown-red; lesser wing coverts maroon colored; greater wing coverts marked at the extremity with steel-blue, forming a bar across the wings; primary wing feathers bay; tail iridescent black; hackle well feathered, touching the shoulders; wings large and well quilled; back short; breast round and black; tail long and sickled, being well tufted at the root; the carriage is upright and elegant.



EARL DERBY GAME.

Beeton, an English author describes them as follows: Head fine and tapering; face, wattles and comb bright red; extremities of upper mandible and the greater portion of the lower one white, but dusky at its base and around its nostrils; chestnut brown around the eyes, continued beneath the throat; shaft of neck hackles light buff; web pale brown edged with black; breast shaded with roan and fawn color; belly and vent of an ash tint; primary wing feathers and tail black, the latter carried vertically and widely expanded; legs, feet and nails perfectly white.

III. Brown-Breasted Red Games.

Not inferior perhaps to the foregoing in point of elegant carriage and courage are the Brown-breasted reds. Tegetmeier justly says that since they have long been sought for the pit, by men who rear them solely to this

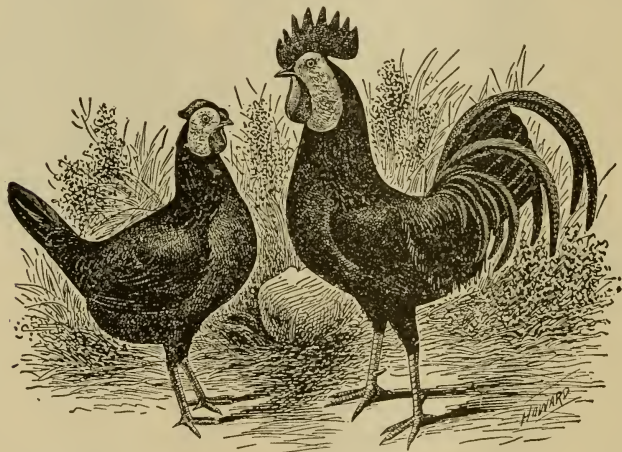


end, variation in shades of color is cared nothing about. Hence under the name of Brown-breasted red are included streaky-breasted, marbled-breasted, and ginger-breasted reds, and various other shades of color. There is no breed of Game having so many variations in color, caused by

mating together blues, piles, duns, and brown and black-breasted reds; so that there is little uniformity of color in the strain. In the purest strain is a light streaky breasted cock, with back and shoulder coverts dark crimson; saddle red maroon on centre, passing off to a dark lemon and straw; hackle red, with the middle of each feather dark. The hen should have a nearly black body, but intermixed with gray on the wing; the hackle bright, brassy or golden.

IV. Duck-Winged Games.

Like the Brown-breasted reds, there are several varieties of the Duck-wings. The Silver Grays are considered to be, perhaps, the purest in type; but each fancier has his own peculiar strain. Tegetmeier describes the best cocks, correct in color, as having the hackle nearly clear white, with a very slight tinge of straw color, without any decided yellow tinge or dark streak on the feather. The saddle should be as nearly as possible the color of the hackle; the breast of a maroon straw; the

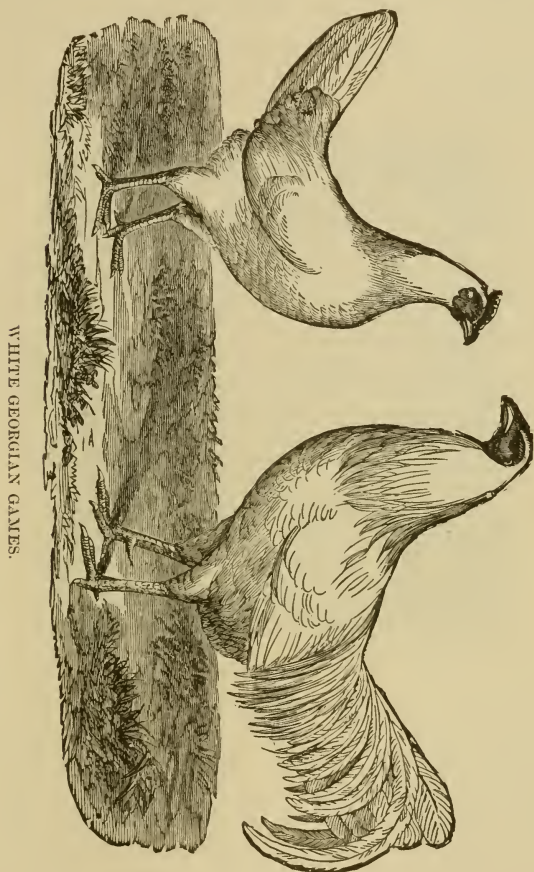


PAIR OF WHITE-FACED BLACK SPANISH FOWLS.

shoulder coverts a rich brass or copper maroon; the breast and tail pure black. The hens to match these cocks should have their necks of a clear silver, striped with black, the silver to go right up to the comb, but being a little darker above the eyes; the back and shoulder coverts a bluish-gray, shaft of feather scarcely showing any difference from the rest of the feather, any approach to red or penciling being decidedly objectionable; the breast salmon color, of a rich shade.

V. White Georgian Games.

This magnificent breed of Southern games makes one of the prettiest sights we have ever seen on the lawn. Their elegant carriage, pure white color, great courage and intelligence, make them decided favorites



WHITE GEORGIAN GAMES.

wherever known. They are of European origin, like all other Games, but have been bred pure in the South, and are now, we believe, unknown in Europe except by specimens carried there. They are as good farm fowls—the eggs being delicate, the flesh excellent—as they are game in the

pit. Their characteristics are: In color they must be pure white all over, with no shade whatever on neck, breast, hock or tail. The legs may be white or yellow; and the beak should harmonize with the legs; the comb, ear lobes and wattles must be of the deepest vermilion color. The yellow beak and legs are generally preferred, since they are supposed to indicate greater hardiness; but we have never seen any difference in this respect between the white and yellow legged birds. Still, the latter will continue to be preferred for cooking, in response to a somewhat popular, but probably erroneous taste.



LIGHT BRAHMA.

VI. Game Bantams.

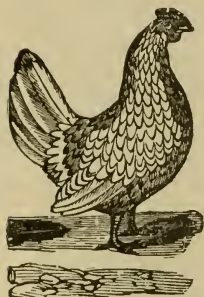
Many of the varieties of the large games have their representatives in the bantams; specimens of the game bantams are often but little larger than pigeons, but they all possess the erect carriage, wonderful courage, and brilliant plumage of their larger relations. To our mind, the Black-breasted reds combine more good qualities than any other. They may be kept in the yards with the large Asiatic breeds without any danger of intermixture, but they will nevertheless be found fully masters of the yard and will always give due warning of danger to the flock, and assist materially in its protection from intruders. Fall broods of any of the bantams make the handsomest and smallest specimens, and show birds are usually thus bred.

VII. Other Bantams.

The principal varieties bred are the Black, the Cochín, the Feather-legged, the Nankin, the Pekin, the White, the Seabright and the Japanese. The two latter will be sufficient for notice here as being the two most distinct and elegant of all the varieties.

VIII. The Seabright Bantam.

These are of two varieties, the Golden-penciled, and the Silver-penciled, identical, except in the color of their plumage. A peculiarity of these is, that occasionally an old hen, or a barren one, will assume the plumage of the cock, a remarkable reversion. It is worthy of note, however, that the males of the Seabrights are all what are called hen-tailed breeds.



SEABRIGHT BANTAM.

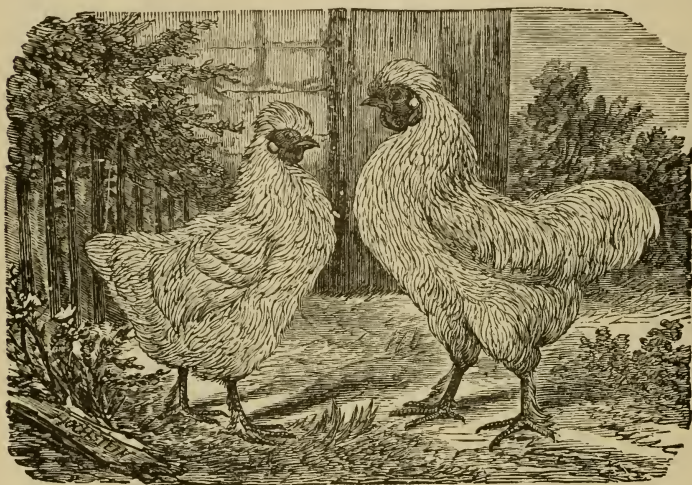
The standard for the Seabrights whether Gold or Silver-penciled, is: The weight of the cock should not exceed twenty ounces at most; the hen not more than sixteen. Hens have been shown weighing not more than twelve ounces. The plumage of the Silver bantam is of a silver-white color with a jet black margin. The Golden variety is identical except that the ground color of the plumage is golden. The legs are smooth, the heads are clean, the comb double and pointed at the back, and the tail straight and without the long sickle feathers. Whether they be golden or silver spangled, the value of the birds consists in the delicacy and pencillings of the markings.

IX. Japanese Bantams.

These are without doubt the most striking of any of the varieties of bantams. Their carriage and general contour remind one of the best specimens of the white Leghorn, except that the comb of the hen is fully upright. This rare breed has a pure white body, the tail long, and the shafts of the sickle feathers white, long, upright, with the ends slightly curved, but carried over the back. The comb should be very long, broad, and moderately serrated, extending well back; the wattles long, pendant, and bright red. The legs are short and yellow; the body of the wings is white, but the quill feathers black. The hens are fan-tailed and the comb somewhat crinkled. These fowls cannot stand hard weather, and the chicks are quite tender. Hence they should not be hatched until warm weather sets in. The illustrations show perfect representations of these elegant fowls.

X. Frizzled Fowls.

Among the most curious of the gallinaceous tribe are the frizzled fowls, originally said to have been brought from Java, and occasionally found in the collections of amateur fanciers. The color should be pure white, though there are varieties bred brown and also black. Their peculiarity consists in their feathers being frizzled or rolled back. They are not useful, and their only value consists in their curious appearance.

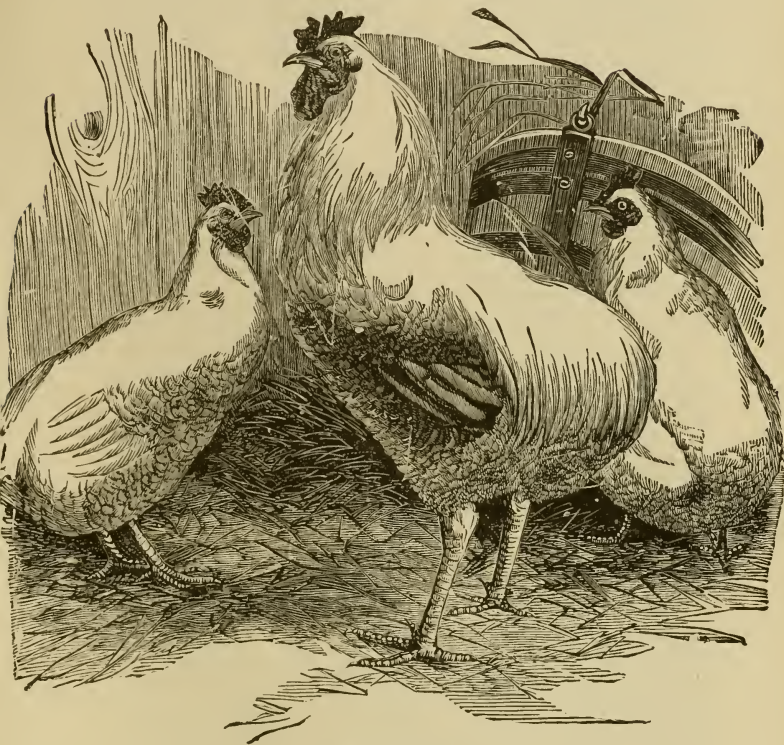


PAIR OF SILKY FOWLS.

XI. Rumpless Fowls.

Rumpless fowls have been known for centuries at least. They were known in Virginia in the last century, and Buffon would have had the generation for whom he wrote believe, that short tails, or the want of tails was a characteristic of American animated creation; and he gravely accepted as truth that English fowls gradually lost their tails when transplanted to America. If he had been better informed he would have known that Aldrovandus described the rumpless fowls more than a hundred years before his time. It is the Persian or rumpless cock of Latham. They have been bred of various colors, including black. The most fashionable variety now is pure white, with a small single comb as shown in the illustration. Rumpless bantams have also been bred. I

fact, it would seem not difficult to breed off the tail feathers of any fowls. None of the rumpless breeds, however, have particular value except as curiosities.

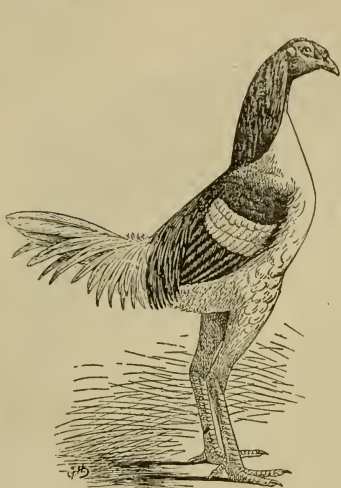


RUMPLESS FOWLS.

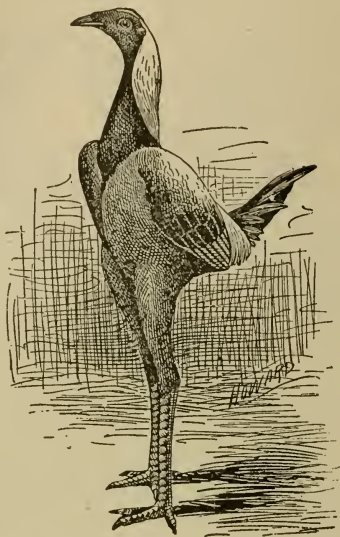
XII. Silky Fowls.

This is also a breed more curious than useful. Its chief peculiarity is, that the feathers are filamentous and lack cohesion, giving the plumage a silky appearance. They are sometimes called negro-fowls, from the fact that the skin is of a dark violet color, or almost black, and the wattles and low, flat comb often dark purple, and covered with wart-like excrescences. The bones are also covered with a dark membrane, so that taken altogether they may be regarded as the most singular of the

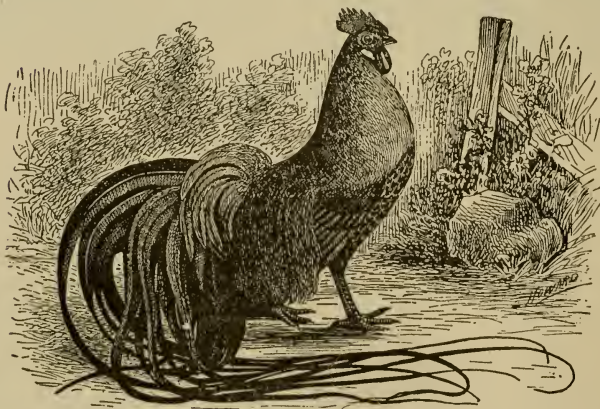
whole gallinaceous tribe. The silk fowl is a native of Asia, and the most fashionable specimens are now bred pure white. The young chickens are covered with a yellow, silky down and are most interesting. Aside from their curious appearance, they have little value.



RED PYLE GAME COCK.



SILVER DUCKWING GAME COCKEREL



LONG-TAILED JAPANESE GAME COCK.



AMERICAN DOMINIQUE, MALE.

From "Perfected Poultry of America," used by courtesy Hon. F. D. Coburn,
Secretary Kansas State Board of Agriculture.



AMERICAN DOMINIQUE, FEMALE.

From "Perfected Poultry of America," used by courtesy Hon. F. D. Coburn,
Secretary Kansas State Board of Agriculture.

CHAPTER IV.

ASIATIC FOWLS.

I. THE VARIOUS ASIATIC BREEDS.—II. DARK BRAHMAS.—III. LIGHT BRAHMAS.
—IV. COCHIN FOWLS.—V. GENERAL CHARACTERISTICS OF COCHINS.—VI.
WHITE COCHINS.—VII. BUFF COCHINS.—VIII. PARTRIDGE COCHINS.

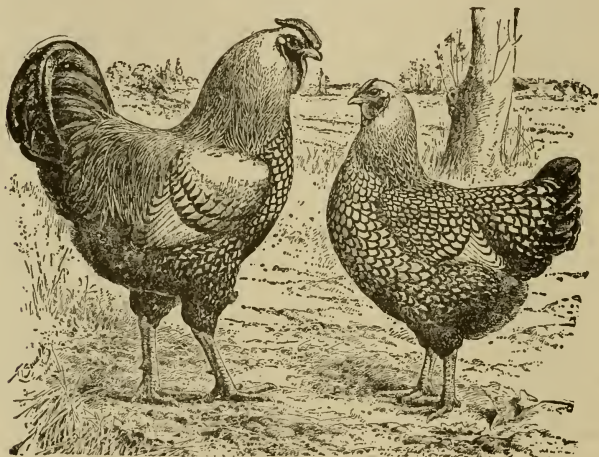
I. The Various Asiatic Breeds.

Of all the varieties of the large Asiatic breeds introduced into the United States, first and last, the Brahmas and the Cochin Chinas alone have held their own with other popular breeds, and have been generally disseminated. The so called Shanghai and the Chittagong—the latter confessedly the giants of the larger breeds of fowls—have not fulfilled expectations. We shall, therefore, give the Chittagong only a passing notice, and simply delineate the principal varieties of the Brahmas and the Cochins. Of the Shanghais it may be remarked, that, when first introduced, they were the largest of the fowls imported up to that time, and were of various colors, gray, buff, cinnamon-colored, partridge and black; and it is more than probable that some varieties of the Cochins owe their parentage to a union of the Shanghai and Chittagong, if indeed the so called Shanghai be not a Cochin and nothing else. However this may be, neither the Cochins nor Brahmas were originally from the Brahma-Pootra river, in India, since this region having been in the possession of the English so long, these remarkable fowls, if they had existed there, could not have remained unnoticed.

II. Dark Brahmas.

As bred both in England and America the characteristics of the dark Brahmas are as follows: The head of the cock should be surmounted with what is termed a “pea-comb.” This resembles three small combs running parallel the length of the head, the centre one the highest; beak strong, well curved; wattles full; ear-lobes red, well rounded and falling below the wattles. The neck should be short, well curved; hackle full, silvery white striped with black, flowing well over the back and sides of the breast; feathers at the head should be white. Back very short, wide and flat, rising into a nice, soft, small tail, carried upright; back almost white; the saddle feathers white, striped with black,

and the longer the better. The rise from the saddle to the tail, and the side feathers of the tail to be pure lustrous green-black (except a few next the saddle), slightly tipped with white, the tail feathers pure black. The breast should be full and broad, and carried well forward; feathers black, tipped with white; wings small, and well tucked up under the saddle-feathers and thigh fluff. A good black bar across the wing is important. The fluff on the hinder parts and thighs should be black or dark gray; lower part of the thighs covered with soft feathers, nearly black. The markings of the hen are nearly similar to those of the cock. Both sexes should have rather short yellow legs and profusely feathered

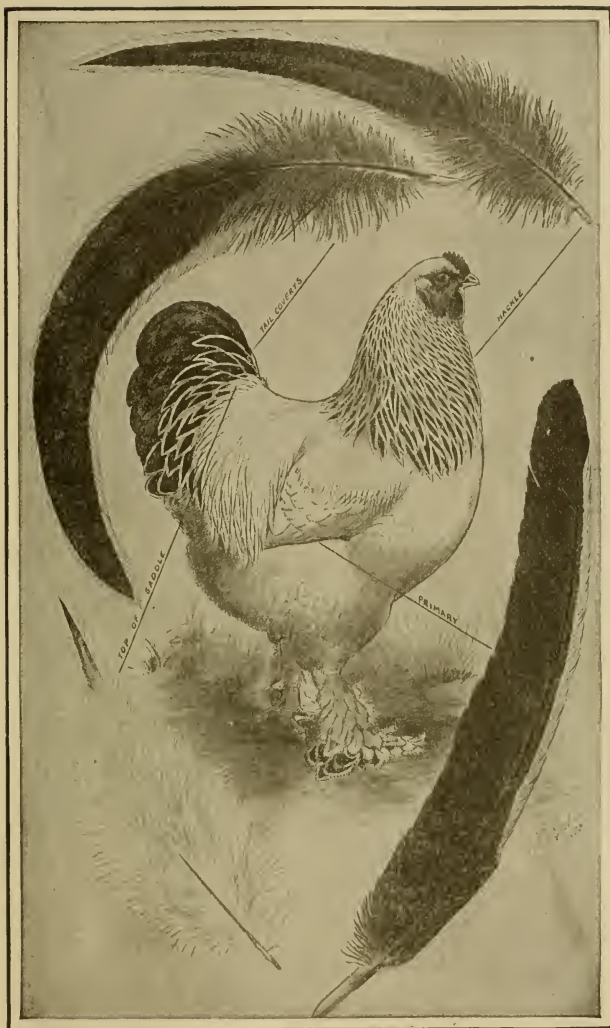


A PAIR OF SILVER-LACED WYANDOTTES.

on the outside. The carriage of the hen is full, but not so upright as that of the cock. The markings of the hen, except the neck and tail, are the same all over, each feather having a dingy white ground, closely penciled with dark steel gray, nearly up to the throat on the breast.

III. Light Brahmas.

The best of these fowls should be mostly white in color, but if the feathers are parted, the bottom of the plumage will appear of a bluish-gray. The neck-buckles should be distinctly striped with black down the



LIGHT BRAHMA MALE AND FEATHERS.

From "Perfected Poultry of America," used by courtesy Hon. F. D. Coburn,
Secretary Kansas State Board of Agriculture.



LIGHT BRAHMA FEMALE AND FEATHERS.
From "Perfected Poultry of America," used by courtesy Hon. F. D. Coburn,
Secretary Kansas State Board of Agriculture,

center of each feather. The plume of the cock is often lighter than that of the hen; the back should be quite white in both sexes. The wings should appear white when folded, but the flight feathers are black; the tail black in both cock and hen; in the cock, however, it is well developed, and the coverts show splendid green reflections in the light; it should stand tolerably upright, and open well out laterally, like a fan; the legs should be yellow, and well covered with white feathers, which may or may not be very slightly mottled with black; ear-lobes must be pure red, and every bird should have a perfect pea-comb. The illustration shows both the penciled or dark and also the light Brahma.



SINGLE-COMB WHITE LEGHORN COCK.

IV. Cochin Fowls.

As an indication of the steady and increasing popularity of this, the largest of valuable barn-yard fowls, it is only necessary to enumerate some of the principal varieties into which they have been broken up, according to the taste or fancy of breeders. These are, White, Buff,

Cinnamon, Grouse or Partridge Cochins, Lemon, Silver Buff, Silver Cinnamon, Black Cochins, Cuckoo, and Silky-feathered Cochins. We illustrate three of the best known breeds, the White, the Partridge and the Buff Cochins. Although among the largest of barn-yard fowls, they endure confined quarters well; but it must be remembered that even the



BARRED PLYMOUTH ROCK FEMALE AND FEATHERS.

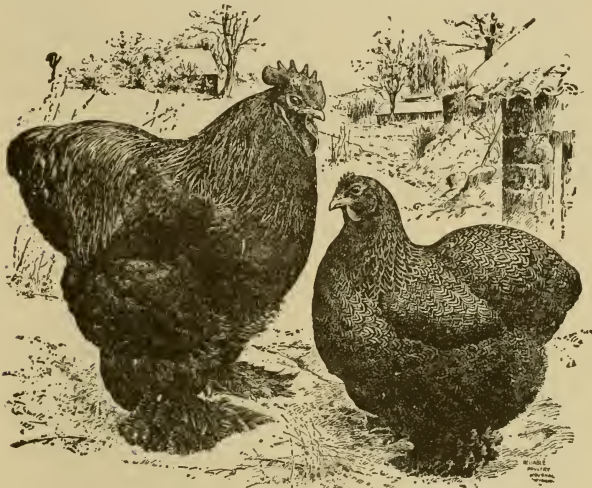
From "Perfecting Poultry of America," used by courtesy Hon. F. D. Coburn, Secretary of Kansas State Board of Agriculture.

most domestic of fowls cannot remain healthy unless they are allowed a fair amount of exercise. Among the best of the breeds for farmers are the White Cochins, the Buff Cochins, and the Partridge or penciled Cochins. It may also be remarked that the principal objection to the Brahmans, and especially the Cochins, is that they accumulate fat so rapidly at

maturity that they are subject to apoplexy and kindred disorders. This may, however, be avoided by plenty of exercise, and a rather low diet. The engravings of Buff Cochins cock and hen show the general shape and carriage of the several sub-families.

V. General Characteristics of Cochins.

The characteristics which will apply to the several varieties are now generally accepted to be as follows: In the cock the comb single,



A PAIR OF PARTRIDGE COCHINS.

fine, rather small, upright and straight, with well defined serrations, stout at the base and tapering to a point; head small and carried rather forward; eye bright and clear; deaf ears pendant and large; wattles large and well rounded on the lower edge; the hackles of the neck full and abundant, reaching well to the back; back broad, with a gentle rise from the middle to the tail, and with abundant saddle feathers; wings small, the primaries well doubled under the secondaries, so as to be out of sight when the wings are closed; tail small, curved feathers numerous, the

whole tail carried rather horizontally than upright ; breast deep, broad and full ; thighs large and strong, well covered with soft feathers ; vulture hocks, those with long, stiff feathers, are objectionable ; the fluff soft and abundant, well covering the thighs and standing well out behind ; legs rather short, thick and bony, wide apart, and well feathered on the outside to the toes ; toes stout and strong, the anterior and middle toes well feathered ; the carriage not so upright as in other breeds. The hen should correspond with these points, but be more feminine in appearance ; for instance, the comb should be single, very small, fine, low in front, perfectly straight with well defined serrations, and the tail, of course, lacking the sickle feathers.

VI. White Cochins.

These are sturdy, heavy birds, and among the best foragers of any of the Asiatic varieties. The standard for color, the other characteristics being as given under the general head, is : Comb, face, deaf-ear and wattles, brilliant red ; plumage pure white throughout, the cock as free from yellow tinge as possible, the hens entirely free from any tinge whatever ; legs bright yellow.

VII. Buff Cochin.

The points for cocks of this breed are as follows : Comb, face, deaf-ear and wattles, brilliant red ; head, rich clear buff ; hackle, back, wings, and saddle, rich, deep golden buff, the more uniform and even the better ; quite free from mealiness on the wings ; breast, thighs and fluff, uniform, clear, deep buff, as free from mottling and shading as possible ; tail, rich dark chestnut, or bronze chestnut mixed with black, dark chestnut preferable ; legs, bright yellow ; leg feathers, clear deep buff.

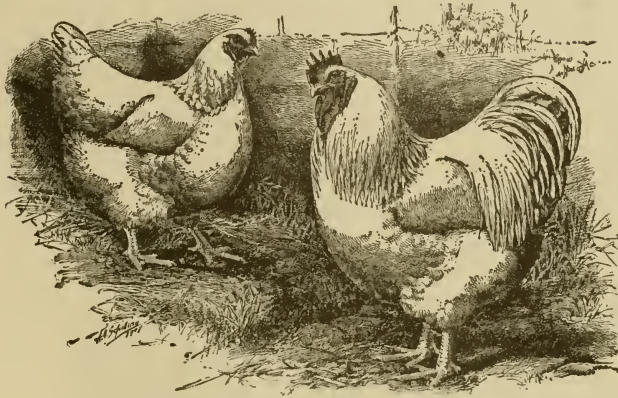
The color of the hen should be as follows : Comb, face, deaf-ear and wattles, same as cock ; hackle, back, wings and saddle, same as cock, but slight marking at ends of feathers of the neck not a disqualification ; legs, bright yellow, with feathers same color as those of the body.

VIII. Partridge Cochins.

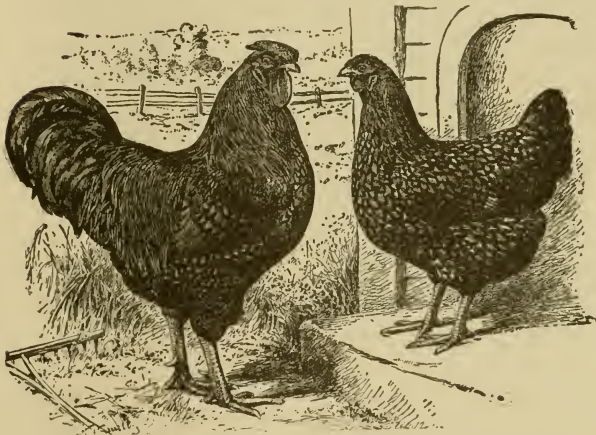
The illustration will give a good idea of this magnificent breed of fowls. The points of color are :

COLOR OF COCK.---Comb, face, deaf-ear and wattles, rich brilliant red ; head, rich red ; hackle, rich bright red, with a rich black stripe down the middle of each feather ; back and shoulder coverts, rich dark red ; wing bow, rich dark red ; greater and lesser wing coverts, metallic greenish black, forming a wide bar across the wings ; primary wing quills, bay on outside web, dark on inside web ; secondary wing quills, rich bay on the outside web, black on the inner web, with a metallic

black end to each feather; saddle, rich bright red, with a black stripe down the middle of each feather; breast, upper part of body, and thighs, rich deep black; tail, glossy black (white at the base of the feathers objectionable, but not a disqualification.)



A PAIR OF SINGLE COMB WHITE ORPINGTONS.



A PAIR OF GOLDEN WYANDOTTES.

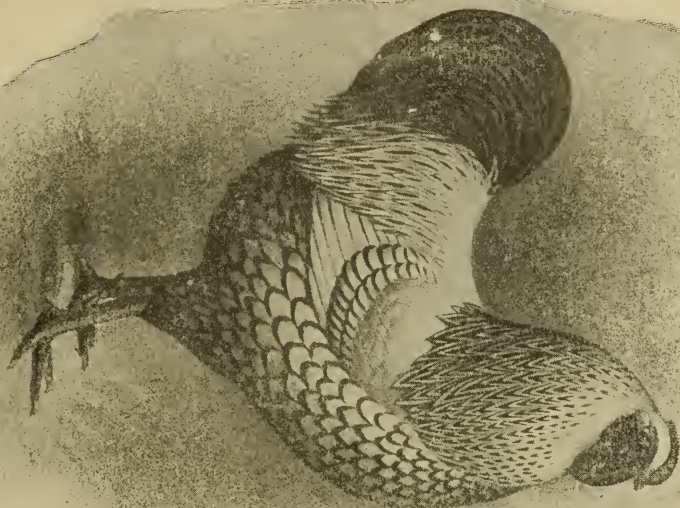
COLOR OF HEN.—Comb, face, deaf-ear, and wattles, brilliant red; neck, bright gold color on the edge of the feathers, with a broad black stripe down the middle; remainder of the plumage, light brown, distinctly penciled with dark brown; the penciling to reach well up the front

of the breast. The shaft of the feathers on the back, shoulder coverts, bow of the wing, and sides, creamy white ; remainder of the plumage, rich brown, distinctly penciled with darker brown ; the penciling reaching well up the front of the breast, and following the outline of the feathers ; legs, dusky yellow, with brown feathers.



PARTRIDGE COCHIN HEN.

SILVER LACED WYANDOTTE, MALE.



SILVER LACED WYANDOTTE, FEMALE.





AMERICAN DOMINIQUE, MALE.



GROUP OF YOUNG LIGHT BRAHMA HALF BREEDS.

CHAPTER V.

NEW, POPULAR BREEDS OF POULTRY.

-
- I. WYANDOTTES.—II. WHITE WYANDOTTES.—III. WYANDOTTE BANTAMS.—
IV. LANGSHANS.—V. AMERICAN JAVAS.—VI. THE ORPINGTONS.
-

I. Wyandottes.

The Wyandottes are one of the strictly American breeds, and were originally known as American Seabrights from their peculiarity of marking. When admitted to the American standard in 1883, they were given the name Wyandotte. Their origin, so far as known, was a cross between the Brahma and Hamburg. As now carefully bred, their characteristic markings are distinct and constant. The plumage is white and black, each feather having a white ground heavily laced with black, the tail being entirely black; the plumage is in fact the white and black speckled of the Hamburg with the black tail of the Brahma. The legs are yellow as are those of the Brahma, but bare like those of the Hamburg. They have the rose comb of the Hamburg, but not so large, and in size they approach the Brahma.

The birds feather early, are plump broilers when young, and retain plumpness with age. They are yellow skinned, thrifty, hardy, and reach a capacity for broiling early. In the adult birds the feathers are white, bordered red with black, giving them a bright, even, speckled appearance. The hackle is penciled white and black, and the tail is quite black. The eggs are medium in size, of a dark buff color, and the laying qualities of the fowls are generally good, but as in the case of any variety, the descendants of cross-bred fowls will depend somewhat on care in selection. The illustration represents highly bred fowls of this variety.

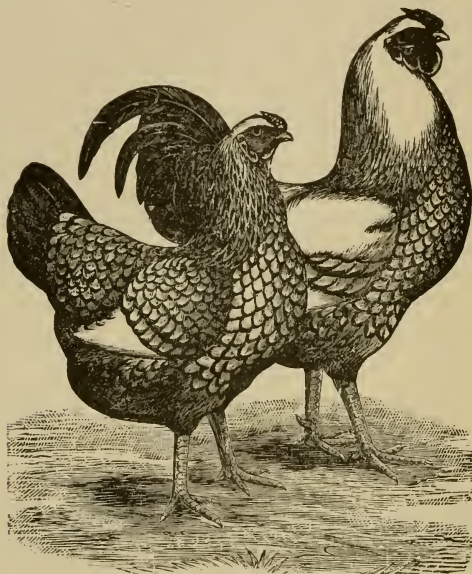
II. White Wyandottes.

Early in the breeding of the Wyandottes (1872) some pure white chicks were observed in a clutch of the laced Wyandottes of Mr. Geo. H. Towle, of New York State, as having the same characteristics of the dark variety. They were bred together until 1886, when they were exhibited in Boston, Mass. This variety are reported to be prolific layers and hardy; are pure white with yellow legs and skin, but yet (1911) they are not generally disseminated.

III. Wyandotte Bantams.

Whenever a new and well received breed is brought out, there are always some who seek to get money out of alleged variations. There

are Bantams of many of the older breeds of fowls. These are produced by in-and-in breeding, and the production of clutches of chickens hatched in the autumn, the growth carefully subdued by light feeding, and strict selection, and this continued for generations until the peculiarities are fixed. Lately Wyandotte Bantams have been advertized. Do not be led astray just yet by these alleged small Wyandottes. They are half starved fall chicks, bred by a smart boy near Chicago, and Bantams only



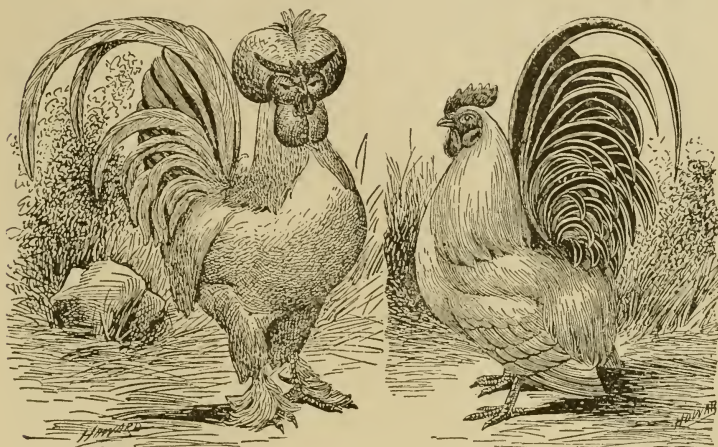
WYANDOTTES.

in name, so we are informed by one of the best authorities on poultry in the United States.

IV. Langshans.

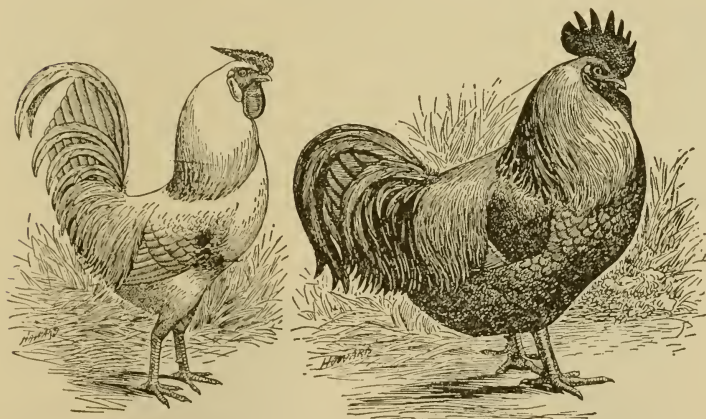
This new breed of poultry, at least in the United States, is distinct in its characteristics, and originating as it did in the provinces of Langshan, Northern China, is one of the most hardy of Asiatic fowls. In China its name is "Yop" (sacred bird), from the fact that it is offered in sacrifice to the Gods of the Chinese. These birds were first introduced into England about 1872, and immediately attracted the attention of fanciers, and also caused a controversy as to whether it was a pure breed. This

question settled, it was admitted to the English standard. Birds were brought to the United States in 1878, and admitted to the standard here in 1883. The excellence of the fowls soon attracted general attention. They are showy, handsome, have the power of resisting disease remarkably, and are noted for their quietude and ability to stand confinement.



SULTAN COCK.

BLACK-TAILED JAPANESE BANTAM COCK.



ROSE-COMB WHITE LEGHORN COCKEREL. SILVER GRAY DORKING COCK.

They are great winter layers, a characteristic of Asiatic fowls, and with special care are also good all the year layers. The hens are good sitters and good mothers; the flesh is considered superior. The chicks when hatched are black with shades of canary color on the head and breast,

but carrying a few white nest feathers when assuming their first plumage. They are of two breeds, white and black.

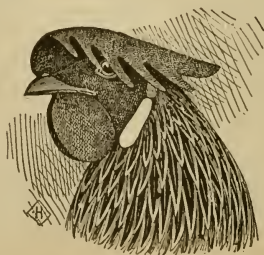
The flesh is white, resembling somewhat that of the turkey. The plumage is dense black throughout, with a beetle green gloss on back, wing and sickles, the feathers in the sun's rays showing vivid scintillations. The tail of the cock is large, wide spread and carried well up with glossy side hanging, and long sickle feathers; hackles full, flowing and quite glossy; head small for the size of the fowl; comb single, straight, and evenly serrated; wattles and ear lobes deep rich red; legs dark slate color and lightly feathered on the outer toe; bottom of feet and web between the toes pink.

There is no doubt but the Langshans are among the most practically useful of the Asiatic breeds, but they must not be confounded with the Black Cochins, a most excellent fowl, and which have been sold by some unscrupulous breeders for Langshans. The home of the Langshan is a 1,000 miles from Cochins, China. The Langshans are more erect, and have larger and better feathered tails, than the Black Cochins, and are considered more vigorous, active and hardy. The Langshans are of great size, cockrels weighing, at seven months of age, if fat, ten to twelve pounds, and pullets, of the same age, eight to nine pounds.

The chicks are noted for rapid growth, small dense bone in proportion to weight of the fowl, white flesh and skin, full breast, and finely flavored flesh, not having the dryness so often found in the large breeds. The illustration gives excellent portraits of this now famous fowl.

V. American Javas.

This breed is attracting some attention of late years. They are not generally disseminated, but are described upon the authority of Mr. Bicknell, as large, long bodied fowls, with deep, full breasts, handsome and hardy. There are two varieties bred, one black, the other mottled. The difference is only in color. The combs of both varieties are single; legs yellow; shanks free from feathers; skin yellow. The flesh when cooked is said not to present the objectionable dark color of some of the breeds of fowls.



HEAD OF SINGLE-COMB BROWN LEGHORN HEN.

VI. The Orpingtons.

To a Mr. Wm. Cook is credited the honor of having originated the Orpingtons, which were named after his own home. It is admitted also that he originated all the varieties, we believe, except possibly the Buffs, but there was some little dispute about this, some claiming that what he called Buff Orpingtons were the fowls originally known as the Lincolnshire Buffs. In any event they are all Orpingtons and to Mr. Cook belongs the honor of their propagation.

The Buff Orpington.—The Buff Orpington is a compact fowl, created through the Golden-spangled Hamburg, Buff-Cochin, and Colored-Dorkings. The Orpingtons are a large-sized, compactly-built, general-purpose fowl, broad, deep, with a fairly good length of back and body, built a little more after the Cochin type than any other of the general-purpose fowls. They have wonderful vitality, are good egg producers, and highly valued as table poultry. They have good length and fulness of the breast and plumpness of the carcass. They are very attractive fowls in all their varieties, and have gained great reputation throughout the world in a very few years.

The Black Orpingtons.—The Black Orpington was produced from Black Minorca male birds, black sports from Plymouth Rocks and Black Langshan males, only clean-legged specimens being selected. This united the blood of the Minorca, the Plymouth Rock and the Langshan, after carefully selecting their offspring to produce the present-day Black Orpingtons, both single and rose-combed.

This variety has the same general breed characteristics demanded of all of the varieties of the breed.

The shape of the Black Orpington conforms to the Buffs, except that they lean more toward the Langshan than the Cochin. They are larger than the Buff variety, but are not so much like the Cochin as the Buff and the Jubilee varieties. In color of plumage they are a rich, glossy black, some of them beautiful in finish; bottom of the feet showing the pinkish white; eyes, dark; face, wattles and ear-lobes, bright red; skin, pinkish white. The only difference between the single and rose-combed specimens of this variety lies in the combs.

The White Orpington.—The White Orpingtons are believed to have been produced from White Leghorns, White Dorkings and Black Hamburgs.

The same general type of breed conformation pertains to all the Orpingtons. It varies, however, an appreciable difference in the type of the several varieties. The Buffs and Jubilee varieties lean toward the Cochin type, while the Blacks and White favor the Langshans.

The Jubilee Orpington.—This variety is produced by crossing Hamburgs, Cochins and Speckled Dorkings. These crosses produced birds of fine size, possessing prolific egg-producing qualities. They have four toes on each foot, white legs, light horn or white beaks. They are bred in both the single and rose-combed varieties. They have a deep body, long, prominent breast, skin and flesh very white, with round, bulky formation, typical of all the Orpington family.

CHAPTER VI.

INCUBATORS AND BROODERS.

ARTIFICIAL INCUBATION

- I. THE ANTIQUITY OF ARTIFICIAL INCUBATION.—II. INCUBATORS VS. HEN.—III. WHEN CHICKS BRING MONEY.—IV. KEEP UP WITH THE TIMES.—V. CARE WHILE IN THE BROODER.—VI. FEEDING YOUNG CHICKS.—VII. HOW TO MAKE AN INCUBATOR.—VIII. HOW TO OPERATE THE INCUBATOR.—IX. A CHEAP HOME-MADE INCUBATOR.—X. HOW TO MAKE THE BROODER.

I. The Antiquity of Artificial Hatching.

How long artificial incubation has been practiced is not definitely known. This principle was known in Egypt many centuries ago. It has long been practiced in China. In Egypt ovens were used. In China the same general plan was in operation. In warm climates the use of brooders are not so essential as in cold climates. Efforts were made from time to time in France and in the United States in the direction of artificial incubation, but little progress was made until a perfect brooder became an accomplished fact. It is only within the last few years that real progress has been made in rendering incubators and brooders practically successful, and only within the last three years is it the fact that eggs have been hatched and reared more successfully than by the natural process.

II. Incubators vs. the Hen.

The incubators will not hatch every fertile egg, neither will the hen. In intelligent hands, however, the incubator will hatch more eggs in cold weather than the hen, and in warm weather about as many. The brooder will take care of chickens better than the hen if the temperature is properly controlled. The incubator does not, like the hen, drag the chicks through the dew and dirt. It does not cover the chicks with lice, like too many hens. The food can be just what is required. The water is pure, and the weak chick is not without food, since there is always enough for all.

One reason why the incubator should hatch more eggs than the hen, is, the eggs if gathered properly are known to be fresh. They can be tested readily from time to time, and infertile eggs removed. The principal thing to attend to is to know that the incubator retains its heat without requiring too much attention. The operator must learn how to manage the machine, and this any intelligent man or woman may easily do. In fact, women take most kindly to the work, and become enthusiasts in the care of the fluffy chicks.

III. When Chicks Bring Money.

"The early bird catches the worm." The early hatched chick brings the money. You can hatch eggs in the incubator as soon as the hen can be made to lay. You cannot hatch eggs by the natural process in cold weather unless you have special facilities for so doing. By means of the incubator and brooder, you can get little broilers into market by the time it is safe to set a hen out of doors. To raise broilers by means of the incubator and brooder requires comparatively little room. Villagers can do this even if they keep no hens, by contracting for eggs from such farmers' wives as raise good poultry.

As fast as one clutch is hatched you can put another lot into the incubator. You can hatch the eggs of any birds, including those of turkeys, ducks and geese. The time required for hatching the eggs of the various species of barnyard fowls will be found on page 1164. The money, however, is in chickens.

IV. Keep up with the Times.

What you want to do to be successful, is to study your incubator and brooder until you are sure you understand the working perfectly. Practice with it without eggs until you are sure as to the regulation of the temperature. Among other things, you must know how much water to use, and the colder the weather, the more hot water. Water must be kept in the ventilator. It must be fresh when put in, and be changed every day.

You must have a correct thermometer, and learn to use it. The heat should be as near 103 degrees Fahrenheit as possible until the last three days, then, not over 102 degrees. The extremes of temperature are between 95 and 105 degrees. A temperature of 108 degrees for a short time will not kill the life of the egg, nevertheless it should never be allowed to get so high.

Keep the incubator where there are no odors, and when the chickens are hatched, let them remain in the incubator until they are dry before removing them to the brooder. The heat of the brooder should never go below 90 degrees.

V. Care While in the Brooder.

The brooder must have sufficient heat and plenty of fresh air, and the air must be warm. There are several good brooders as well as incubators for sale in the market. We illustrate an incubator—by a series of cuts—simple in its construction, perfect in its working, and that with the aid of the carpenter and tinman, can be made on the farm. Also a brooder.

VI. Feeding Young Chicks.

Chicks require no food for the first twenty-four hours after hatching. The second day the food should be hard boiled eggs. Then bread and milk may be allowed. The fourth day, and thereafter, feed equal parts of oatmeal and cornmeal cooked together with milk. Feed five times a day until the chickens begin to feather. Thereafter four times a day. When the chicks are ten or twelve days old they may have screenings of wheat, cracked corn, gravel, finely powdered oyster shell, bone meal, and clean water where they can always take it. The food must be varied; mashed potatoes, chopped onions, cabbage, or lettuce should form part of the food, and in lieu of insects give them finely minced meat. Do not crowd them. Keep them in small lots. Feed in vessels that may be kept clean, and let the water always be pure.

VII. How to Make an Incubator.

We have been at some considerable trouble to lay before our readers some practicable plan by which a common sense incubator could be made on the farm, by means of the village carpenter and tinman. In correspondence with Mr. P. H. Jacobs, a gentleman who is an acknowledged authority on poultry, we learned that his facile pencil had contributed to the *Farm and Garden*, of Philadelphia, drawings, of not only incubators, but of brooders as well. A letter from Mr. Jacobs to the editor of the *Farm and Garden*, brought the response back, we were welcome to the cuts and descriptive matter to make the whole intelligible. The offer was accepted with thanks for the courtesy, and thus we are enabled to lay before our readers the latest improvement in practical artificial incubation and brooding of chickens. Of course there are many good incubators and brooders patented and otherwise. The reader can avail himself of these upon investigation, but the following will fill the bill in a common sense way. It is so fully illustrated, that the description annexed will be all that is required to make the whole quite intelligible, and is as follows:

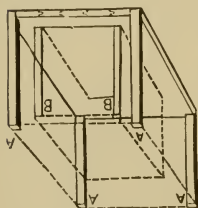


FIG. 1. INNER BOX.

First, get good boards, 1 inch thick and 1 foot wide. Cut them 46 inches long for your floor, and have the floor 42 inches wide. Place four posts, which are 24 inches high, at each corner (figure 1) marked *A A A A*, and two posts (*B B*) in front, the two front posts to be 18 inches high. Make posts of 2x3 strips and nail them securely to the floor. Fasten the floor boards together by strips underneath, using as many as preferred. The four corner posts are for your outer box. This box, when finished, is 4 feet long and 44 inches wide, outside, provided it is

made of boards one inch thick. Including its top and floor, it is 26 inches high. Nail on your side boards. Let rear and front end boards cover ends of side boards. After the tank is in, and the top of the *inner box* is on, cover inner box with sawdust, and nail down the top of outer box. Tongued and grooved boards should be used for every part of the incubator except the floor, which should be of heavy boards. All the measurements given here, however, are for boards one inch thick, but three-quarter stuff may be used if desired.

Inner box. This holds, or rather comprises, ventilator, egg-drawer, and tank. It is 40 inches long and 32 inches wide, outside measurement, and must hold a tank 30x36. The side boards are nailed to the posts *B B* (figure 1) and front boards of outer box, and fastened at the rear

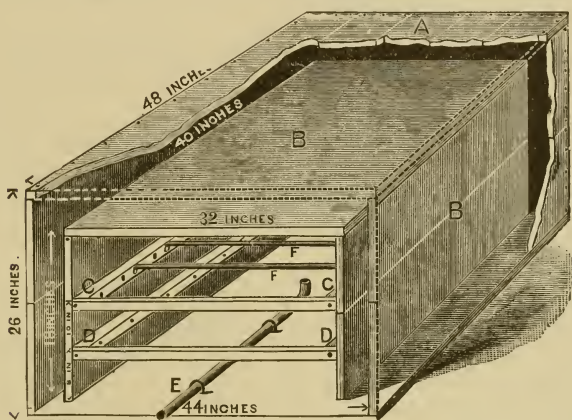


FIGURE 2. INTERIOR OF INCUBATOR.

end by the rear boards being nailed to the ends of the side boards. Cleats are put on end and sides (on the floor), to fasten the inner box to the floor. Nail the bottoms of the side and rear end boards to the cleats.

To make the inner box, refer to figure 2, which has portions of the outer and inner boxes torn away, to show interior. *A* is the large or outer box; *B* is the inner box; *C C* are strips 1 inch wide and 1 inch thick, nailed to sides of inner box; *D D* are strips 1 inch wide and 1 inch thick nailed to sides of inner box. The strips *C C*, with iron rods, half an inch thick (*F F F F*), hold and support the tank. Let ends of iron rods extend a little into sides of inner box, to assist in supporting the weight of water. The strips *D D* are to hold the egg drawer. *E* is

a tin tube, $1\frac{1}{2}$ inches in diameter and 2 feet long, placed in the front part of the ventilator to admit air. Observe, however, that figure 2 does not show the sawdust in front, as will be explained. We will now take up the separate parts. First is the ventilator. This is simply the bottom of the inner box, being under the egg-drawer, 5 inches deep and 30 inches wide, (the side boards of the inner box being its sides). The front end is boxed off, which includes the front boards and also the sawdust, thus making ventilator, *inside* measurement, 36 inches long. *E* is the tin tube, for the admission of air, before mentioned. Use no sawdust in the ventilator, but paper the bottom well and close, so as to have no air enter except through the tin tube. The tin tube is open at the front on out-

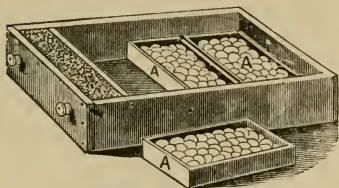


FIG. 3. EGG DRAWER.

side of incubator, and enters into ventilator.

Egg drawer. The egg drawer goes *under* the tank, and rests on the strips *DD* (figure 2). The egg drawer is 4 inches deep, outside measurement. It is 39 inches long, outside measurement (which includes the boxed-off portion in front of drawer), and is 30 inches wide. Three movable trays, each $1\frac{1}{2}$ inches deep, are fitted in egg drawer. Nail strips 1 inch wide and $\frac{5}{8}$ of an inch thick, 1 inch apart, the length of the egg drawer (but not under boxed-off portion) for the bottom. Mortice ends of strips in egg drawer, so as to have the bottom smooth. Tack a piece of muslin on these strips (thin muslin is best), and tack it on the *inside* of the drawer. Now nail strips to bottoms of trays (use lath, if desired, cut to 1 inch width), but you need not mortice them. Simply nail them on the bottom, 1 inch apart, running lengthwise, and tack muslin on the bottom of the trays, *inside*, in the same way as for egg drawer. The inside of your drawer will be 3 inches deep. The sawdust in front of egg drawer (the boxed portion) fits in boxed front of incubator (see figure 5). Put a broad cap on outside of egg drawer, at front end, to exclude air.

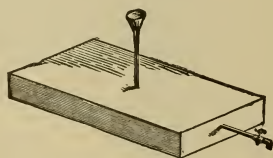


FIG. 4. TANK.

The tank. This is 30x36 inches, and is 7 inches deep. It is supported by the strips *CC*, and rods *FFFF* (figure 2). Being 36 inches long, it goes close up to the *back* boards of the inner box, the front being enclosed by a sliding board, secured with upright strips at each end of

board, 1 inch in diameter (so as to remove tank when necessary), which leaves a small space in *front* of the sliding board to be filled with saw-

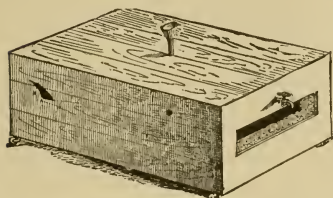


FIG. 5. INCUBATOR READY FOR THE EGG DRAWER.

dust. Have the tank tube in front only long enough to extend through the sawdust in front, and have your faucet to screw into this tube, the tube being threaded. The tube on top of tank should be long enough to extend through the tops of *both* boxes (outer and inner, through the sawdust), and should, therefore, be 7 inches high from top of tank, as is seen at figure 5. When the incubator

is ready, we have figure 5, which shows the sawdust packing in front, by looking into the opening into which the egg drawer enters when filled with eggs.

Figure 6 shows the incubator as if cut in half lengthwise, and displays all the positions. What is meant by the "boxed-off" portion in front, is that portion filled with sawdust in front. The side boards of the inner box are joined, on their front ends, to the front boards of the outer box, being also nailed to the two short middle posts. Fill in between the boxes with sawdust, and if sawdust is scarce, use chaff, oats, finely-cut hay (rammed down), or anything that will answer, but sawdust or chaff is best. In figure 6 *A* is the tube on top, *B* the faucet in front, *C* the opening for the egg drawer, and *D* the tube to admit air into the ventilator. This tin tube should be as close to the bottom of the ventilator as possible. When making incubator, do not forget to cut holes for tubes of tank and also for air tubes to come through, and then putty around them.

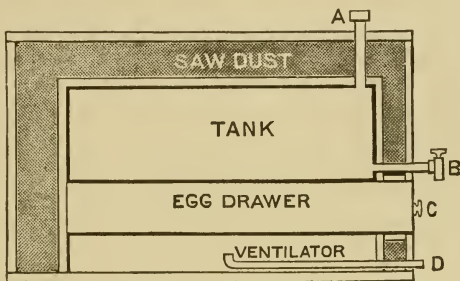


FIG. 6. SECTIONAL VIEW OF INCUBATOR.

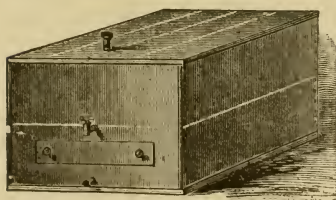


FIG. 7. INCUBATOR COMPLETE.

for tubes of tank and also for air tubes to come through, and then putty around them.

VIII. How to Operate the Incubator.

Each tray holds about 80 eggs, laid in promiscuously, the same as in a nest, making total number for incubator 240 eggs. First fill the tank with *boiling* water, but never allow it to remain in the tube on top, as it thus increases pressure; hence, when tank is full to top of the tube, draw off a gallon of water. Fill it 48 hours before putting eggs in, and have heat up to 115 degrees before they are put in. As the eggs will cool down the heat, do not open the drawer for 6 hours, when the heat should be 103 degrees, and kept as near to that degree as possible, *until the end of the hatch*. It is best to run it a few days without eggs, to learn it thoroughly. Place incubator in a place where the temperature does not fall below 60 degrees. As the heat will come up slowly, it will also cool off slowly. Should the heat be difficult to bring up, or the eggs be too cool, you can raise or lower the trays, using small strips under them. You can also stop up or open the air tube in the front openings of the ventilator whenever you desire. When the eggs are put in, the drawer will cool down some. All that is required then is to add about a bucket or so of water once or twice a day, in the morning and at night, but be careful about endeavoring to get up heat suddenly, as the heat does not rise for five hours after the additional bucket of water is added. The cool air comes from the ventilator pipe, passing through the muslin bottom of the egg drawer to the eggs. Avoid opening the egg drawer frequently, as it allows too much escape of heat, and be careful not to open when chicks are hatching, unless compelled, as it causes loss of heat and moisture at a critical time. *Cold draughts* on the chicks at that time are fatal. Do not oblige visitors. *Be sure your thermometer records correctly*, as half the failures are due to incorrect thermometers, and not one in twenty is correct. Place the bulb of the thermometer even with the top of the eggs, that is, when the thermometer is lying down in the drawer, with the upper end slightly raised, so as to allow the mercury to rise, but the bulb and eggs should be of the same heat, as the figures record the heat in the *bulb*, and not in the tube. Turn the eggs twice a day at regular intervals—six o'clock in the morning and six o'clock at night. Do not let them cool lower than 70 degrees. Turn them by taking a row of eggs from the end of the tray and placing them at the other end, turning the eggs by rolling them over with your hand. By removing only one row you can roll all the rest easily. Give no moisture the first week, very little the second, and plenty the third week. Do not sprinkle the eggs. For moisture, put a wet sponge, the size of an egg (placed in a flat cup), in each tray, the second week, and two sponges in each tray the third week. Do not put in sponges until you are about to shut

up the drawer, after turning. Wet the sponges by dipping in *hot* water. After the first ten days the animal heat of the chicks will partially assist in keeping the temperature. Be careful, as heat always drops when chicks are taken out. You can have a small glass door in front of egg drawer, to observe thermometer, if desired. Always change position of trays when eggs are turned, putting the front one at the rear.

IX. A Cheap Home-made Brooder.

We give an illustration of a brooder in use, figure 1, and select it because it is one of the best, being easily made, and at a low cost, and because it has been *tried* and found to answer all purposes. By refering

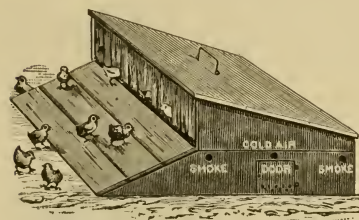


FIG. 1. THE BROODER IN POSITION.

to figure 1 it will be seen that the top is detachable, being lifted off by the handle when desirable. Although the lower part of the brooder is *above* ground, yet, if preferred, it can be sunk in the ground, provided the holes (to admit cold air to brooder, and smoke from lamp to escape) are left above the surface of the ground. Space must be left to

admit of getting at the lamp if brooder is in the ground. Either a No. 2 burner lamp or a small kerosene oil stove may be used for heating the brooder. Be careful to leave air holes at the bottom of the door, or the lamp will smoke. Keep the brooder at a temperature of 90 degrees.

Figure 2 shows the lamp (or kerosene oil stove, if preferred) under a sheet-iron tank. It heats the tank, the smoke of the lamp passing out at four holes, placed at each corner of the brooder, which distributes the heat. The cold air enters around the tank, and is drawn right over it above the lamp, as the cold air rushes in as fast as the warm air rises. The hot air rises through a tube in the floor. It will be seen that the smoke of the lamp does not go into the brooder, and that the tube in the brooder extends through the *wooden floor only*. The brooder is a yard square, but the tank may be smaller; the box containing lamp is ten inches deep, and the space

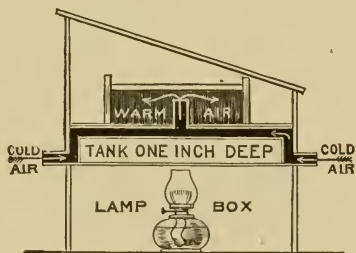


FIG. 2. SECTIONAL VIEW.

between the top of the tank and wooden floor is half an inch. The curtain in front of brooder is simply a piece of cloth cut into strips. The smoke holes of the lamp should be at each *corner*, but only *two cold air holes* are necessary, and they should be near the *centre* of the *sides* of the brooder. Bear in mind the *cold air* goes *between* the tank and the wooden floor, and gets heated.

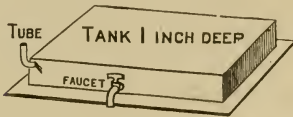


FIG. 3. TANK, SHOWING HOW TO CONSTRUCT IT.

X. How to Make the Brooder.

To make this brooder, cut six boards, 1 inch thick, 6 inches wide, and 3 feet long, tongued and grooved, so that no air can come through except by way of the tube on top, which tube is 1 inch in diameter, and $2\frac{1}{2}$ inches high from the floor. These boards are your *floor*. On the *under* side of this floor, at the edges, nail strips all around (on ends and sides), the strips being 1 inch thick and $1\frac{1}{2}$ inches wide. Then set your tank as shown in cut. You will then have an air space between the floor and tank of half an inch. Be sure and cut air holes to admit the cold air. You may simply have open holes or may use tin tubes, if preferred. The holes need only be a half inch in diameter. You can now easily fit on the lower box, and also make the covering on top, as may be seen by the illustration.

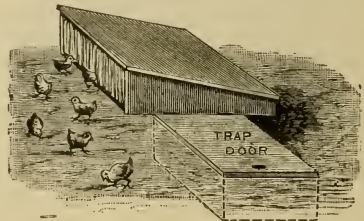


FIG. 4. LOWER PART UNDER GROUND.

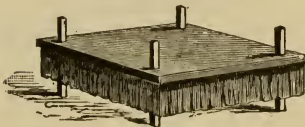


FIG. 5. THE MOTHER.

This brooder is an English method, and shows that upward currents of warm air have been in use for many years for both hatching and brooding. Figure 1 shows the brooder with lamp and tank above ground. Figure 2 shows a sectional view of the same. Figure 4 shows the lower part of brooder under ground, with trap door, for getting at the lamp. Figure 5 shows the mother, which covers the chicks, with adjustable pegs or legs. The tank is from Lewis, the top from Rankin, while the mother is from Bell and others.

CHAPTER VII.

BREEDING AND MANAGEMENT OF POULTRY.

- I. A STUDY OF POINTS NECESSARY.—II. EXPLANATION OF POINTS.—III. POINTS OF THE HEAD.—IV. THE PLUMAGE ILLUSTRATED AND EXPLAINED.—V. IDEAL SHAPE OF FOWLS.—VI. BREED TO A FIXED TYPE.—VII. NUMBER OF HENS TO EACH COCK.—VIII. HOW TO MATE.—IX. BREEDING UPON A MIXED FLOCK.—X. INCUBATION OF VARIOUS FOWLS.—XI. GENERAL MANAGEMENT OF FOWLS.—XII. PROPER FOOD FOR FOWLS.—XIII. POULTRY HOUSES AND COOPS.—XIV. FEED BOXES AND DRINKING FOUNTAINS.—XV. BREEDS FOR MARKET.—XVI. BREEDS FOR EGGS.—XVII. HOW TO FATTEN.—XVIII. KILLING AND DRESSING FOWLS.—XIX. PACKING AND SHIPPING TO MARKET.—XX. GLOSSARY OF TERMS USED BY POULTRY FANCIERS.

I. A Study of Points Necessary.

Careful study of the points and characteristics is fully as necessary to success in the breeding of poultry as in any other department of breeding. It is not enough that you have a general idea of how fowls are to be fed and cared for ; but to succeed—especially as a breeder of pure fowls—



POINTS OF POULTRY, ILLUSTRATED.

one must understand the probable results in mating fowls for a particular purpose. Not only must the contour and physical make-up be understood, but the breeder must have a knowledge of, and nice discrimination for, the various feathers, markings and characteristics, else he cannot hope

for the best success. He should also understand the technical terms used, so that he may school his mind to their exact meaning in applyig them to the fowl. The preceding illustration and references will fully explain all the points. They have been compiled from the best authorities extant, such as the writings of Tegetmeier, Wright and others.

II. Explanation of Points.

The first illustration, with lettered references, is all that will be required in learning the technical terms relating to the exterior of fowls.

Explanation.—*A*—Neck hackle. *B*—Saddle hackle. *C*—Tail. *D*—Breast. *E*—Upper Wing coverts. *F*. Lower Wing coverts. *G*—Primary quill. *H*—Thighs. *I*—Legs. *K*—Comb. *L*—Wattles. *M*—Ear-lobe.

III. Points of the Head.

For the following analysis of the points of the head, and of the plumage, we are indebted to *Moore's Rural New Yorker*. The cut will explain the precise situation of the several parts of the head.

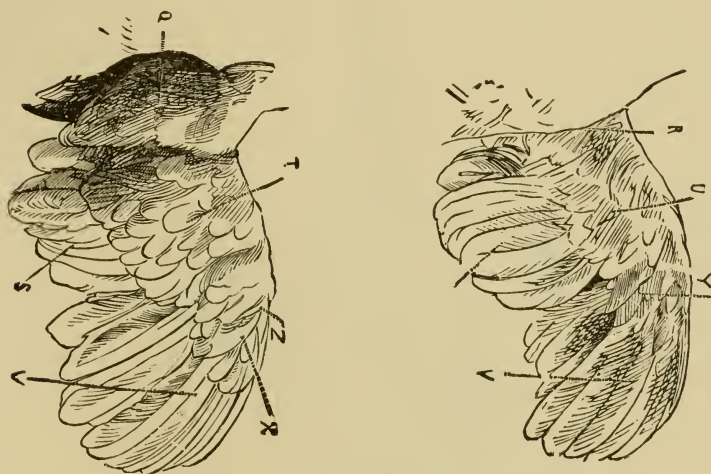


POINTS OF THE HEAD OF COCK.

Explanation.—1—The comb, which surmounts the skull. 2—The wattles which hang underneath and on each side of the beak. 3—The ear wattles, which hang under the cheek. 4—The tufts of little feathers which cover and protect the auditory organ. 5—The cheeks which commence at the beginning near the nostrils, cover all the face and re-unite behind the head by a continuation of the flesh of the same nature, but

covered with feathers. 6—The nostrils which are at the beginning of the beak. 7—The beak, of which the two parts, the upper and lower mandible, are horny.

The head of the cock, as of the hen, is composed of two principal parts: 1st, the skull is a firm union of bones, which include the upper part, or mandible, of the beak; 2nd, the lower part or mandible of the beak, being the lower jaw-bone, formed by a single piece. In the skull are the sockets or cavities which contain the eye; the nostrils are in front of the eye; the auditory organ, or ear, is behind the eye. The head, excepting the beak, is entirely covered by a fleshy covering, round which may be seen several appendages or caruncles, which are the crest, the two ear-



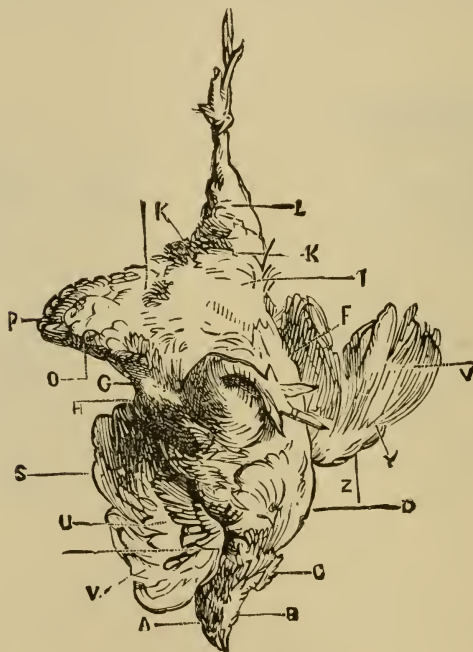
OUTER AND INNER WING PLUMAGE. (See Article IV.)

lobes, and the two ear-wattles. This covering forms the cheeks. The color, the size, the form of each of these parts is varied according to the variety, and often serves to characterize each. A tuft of short feathers called "the tuft" covers the ear.

The comb is straight or drooping; it is single when it is composed of only one piece, double when there are two alike united or near together, it is triple when it is formed of two alike and one in the middle; it is frizzled when full of granulations more or less deep, and erect excrescences; it is a crown when it is circular, hollow, and indented; it is goblet shaped when hollow, vascular, and not indented. There are other forms but they are composed of parts or unions of those particularized.

IV. The Plumage Illustrated and Explained.

With the hen there may be three kinds of feathers distinguished: 1. The large feathers on the wings for flying, and on the rump to form the tail; 2. the middle-sized feathers which cover the large feathers, and are also found on the wing and rump; 3. the neck, the back, the sides, the throat, the shoulders, and a part of the wings. They are always in layers compactly covering those beneath them like tiles. We shall designate them by the name of the places they occupy, and refer to the engravings to render them easy to recognize:

**POINTS OF THE FOWL.**

Explanation—*A*—The upper feathers of the head are small in those fowls not tufted. They surround the skull.

B—The under feathers of the head are almost like bristles. They cover the cheeks in the space which separates on the wattles.

C—The upper feathers of those at the back of the neck are short, and lengthening lower down, forming what is called the hackle. They become longer between the shoulders when they cover the beginning of those on the back and the commencement of the wings.

N—The feathers of the toes appear on the outsides.

O—The middle tail feathers envelop the rump and cover the bases of the large feathers of the tail.

P—The larger tail feathers are in a regular line of seven on each side of the rump, and form the tail.

Q—The outside feathers of the shoulders cover a part of the other feathers of the wing. They form the shoulder.

R—The inside feathers of the shoulders are small, thin, and slender.

S—The larger feathers of the pinion form, when the wing is opened, a large, arched surface, and are of different sizes. These feathers grow out of the under side of the pinion.

T—The small outside feathers of the pinion are of different sizes. They come on all the outside surfaces from the shoulder to the pinion. They begin quite small on the outside edge, and finish a medium size on the inside edge.

U—The inside feathers of the pinion are close, middle-sized, and small, covering the bases of the large feathers of the pinion.

V—The large flight-feathers, or feathers of the hand, are large and strong, and are of most use to the bird in locomotion. They begin at the under edge of that which is called the top of the wing.

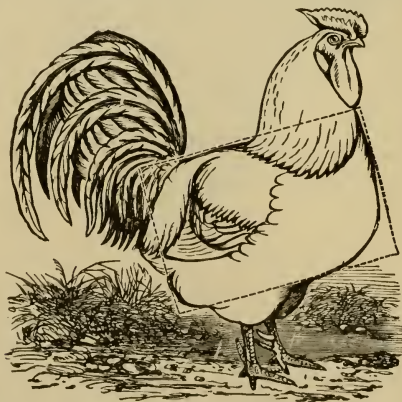
X—The outside flight-feathers cover the large ones; they are stiff and well flattened on the others.

Y—The inside flight-feathers are, some small and others medium-sized; cover the bases of the flight-feathers.

Z—An appendix called the pommel of the wing, which represents the fingered part. It is at the joint of the pinion and has some middle-sized feathers of the same description as the large pinion feathers, and have some small ones to cover them. These feathers assist the flight.

V. Ideal Shape of Fowls.

The Dorking fowl may be taken as the embodiment of as much excellence in the same compass as can be found in any other breed. Hence



IDEAL SHAPE OF FOWL.

we give an illustration of the Dorking, figured to represent the ideal shape of the barn-yard fowl.

VI. Breed to a Fixed Type.

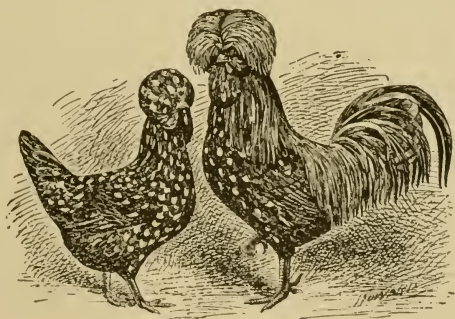
In breeding fowls, always avoid violent crosses. Disparity of form in mating birds can only end in disaster through the cropping out of undue form, and especially by bad effects in the feathering, even after the lapse of many years. The same general rule should be borne in mind that we have stated in previous chapters on breeding live stock; avoid crosses as much as possible, and breed pure when it is possible to do so.

VII. Number of Hens to Each Cock.

The number of cocks to be kept according to the hens will vary with different breeds. One cock to eight or ten hens is sufficient in any breed. This will be the right number for Games, Dorkings, and French fowls; with Spanish Brahmas or Cochins two more hens may be allowed. One Hamburg cock will generally serve for twelve to fourteen hens. When several males are kept, it is better to keep all but one or two of them confined, allowing them to take turns with the flock, since this prevents worrying the hens and ensures better service. When the raising of chickens is alone concerned, it is better to have plenty of males, to ensure fertility. When only eggs are wanted for market, as many will be laid whether properly fertilized or not.

VIII. How to Mate Fowls.

From the age of one to four years is the best time for laying. Hens two years old and over make the best setting hens. Avoid vulture hocks (feathers running down at the hocks as in vultures) in all fowls, and



PAIR OF HOUDANS.

especially in the Asiatic breeds. In breeding Asiatic fowls, let the males be as full-colored as possible, since the tendency of these fowls is to breed to lighter colors; but judgment must be used not to get too violent

contrast in the sexes. So, if the hen is long-backed select a short-backed cock, but if the hen is short-backed, never breed to a long-backed cock; you cannot well have the back too short. In breeding to color, all self-colors should be as solid as possible, and in parti-colored fowls study the birds for mating carefully, so that you may breed as near to a feather as possible, according to the characteristics of the breed. As a rule, heavily penciled males will get heavily penciled chicks, but if the saddle is very heavily striped, or the neck hackle very dark, the chicks will incline to be spotted; but cocks with dark hackles, and hens with hackles lightly penciled will produce chickens delicately penciled.

IX. Breeding upon a Mixed Flock.

If you cannot afford pure-bred stock, buy a sufficient number of cocks for your hens, or select a dozen hens and mate them with a good cock, from which to raise chickens. Once you begin, stick always to the same strain, and in three years you will have a strain of fowls—if you have carefully selected the chicks, always using pure males—good enough for market purposes and eggs. In the meantime, get a clutch of eggs from pure fowls and breed them separate from the others, and soon you will have the pure breed also. There is no farm stock that it pays better to breed pure than poultry, whether they be land or water fowl.

X. Incubation of Various Fowls.

The following table will show at a glance all necessary information in relation to the incubation of various fowls.

NAME OF BIRD.	PERIOD OF INCUBATION.		
	SHORTEST PERIOD.	MEAN PERIOD.	LONGEST PERIOD.
Turkey, sitting on } Hen.... {	17	24	28
the eggs of } Duck... {	24	27	30
the..... } Turkey. {	24	26	30
Hen sitting on the } Duck... {	26	30	34
eggs of the... } Hen.... {	19	21	24
Duck.....	28	30	32
Goose.....	27	30	33
Pigeon.....	16	18	20

XI. General Management of Fowls.

In order to raise poultry successfully, proper buildings and plenty of range must be provided. The buildings need not be expensive, and on the

farm any warm out house will afford comfortable quarters, and range enough is provided in the out fields. On the farm in summer fowls will pick up a good share of their living, insects chiefly, and thus, while partly supporting themselves, they are at the same time profiting their owner by the destruction of insect pests. In fact, fowls, if allowed, will wander considerable distances in search of food, as illustrated in the cut "Foraging for themselves." Those who keep fowls in villages and suburban places, must provide animal food and also green vegetable food in addition to the grain fed. This, with comfortable quarters, care in feeding, and due attention to the health of the birds, constitute about all there is practically in poultry raising, except that pure breeds are kept with a view to the rearing of very superior birds. In the latter case a more careful study of the anatomy, physiology, and points of fowls must be made as in breeding any other animals.



FORAGING FOR THEMSELVES.

XII. Proper Food of Fowls.

Fowls need a variety of food; they are nearly omnivorous feeders. Animal food is essential, but the bulk of the feeding may be grain, either raw or ground. If mixed feed (ground grain) is used, have the dough so stiff that it will not run; never feed sloppy food. Indian meal and potatoes boiled and mashed together, so stiff that the dough clings when squeezed in the hand, is one of the best of foods. Feed on clean ground—never in a trough in summer, since moist food so fed will inevitably become sour, and the troughs are seldom properly cleaned. In winter, ground feed should be fed as hot as the hens can eat it, and a little chopped onion mixed in is excellent; provide other green food also, as cabbage leaves. For animal food, a sheep's pluck, hung so high that the fowls can just reach it, is excellent; so are the greaves from trying establishments. To keep the hens in good laying condition, they must have animal food, and also bones broken so fine that they may be easily swallowed. Very little meat, however, is necessary, for if too much is fed the fowls may lose their feathers. Whole grain, and the drinking water should be kept in some receptacle, so the fowls may take it at pleasure. The grain fed may be screenings from wheat, rye, buckwheat and oats.

XIII. Poultry Houses and Coops.

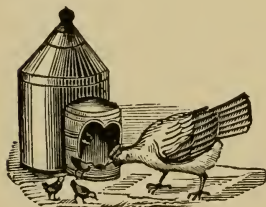
Poultry houses, however simple, should be both warm in winter and well lighted. The side containing the glass should face the South for the

advantage of the sun's warmth in winter. The windows should also be provided with iron netting, so the sash may be raised to admit air in summer, and also in mild weather in winter. One portion should be half-dark, for the laying and sitting hens, and a proper dust bath must also be provided. Have the perches not more than two feet from the floor in the roosting place, and all on one level; let them be large. A two by four scantling, well rounded and set on edge, is not too large for heavy birds. The whole house should be whitewashed once a month in summer, and kept scrupulously clean at all times. If lice make their appearance, fumigate thoroughly, and after cleansing, whitewash with lime to which a little carbolic acid is added. Sprinkle Scotch snuff among the feathers on the backs of the fowls, and give fresh materials for dust bath.

The proper coops for hens with young chickens will readily suggest themselves. A barrel with one head out, laid on its side, and with stakes driven along one end to admit the passage of the chicks is a good makeshift. The ordinary triangular coop is well known. The best coop is a square box 18 by 24 inches, and roofed to shed rain; from the open end of this a runway is thrown nine inches high and as wide as the coop, so closely slatted at the top that old fowls cannot get their heads through to feed. At the end are orifices to give egress and ingress to the chicks. In this way they may be fed without interference from the mother hen or other fowls, and it also furnishes a safe place of refuge from danger.

XIV. Feed Boxes and Drinking Fountains.

Both the feed boxes and drinking fountains should be self-feeding. A three-gallon jug filled with water, and turned mouth down in a suitable dish, and properly supported, makes a tolerable drinking fountain, and will suffice to convey the idea. For a larger number of fowls, a five or six gallon keg, with a faucet with a long spout to rest near the bottom of the drinking trough is good. If filled, bunged tight, and the faucet opened, just enough water will be given up to keep the supply in the trough at a uniform height.

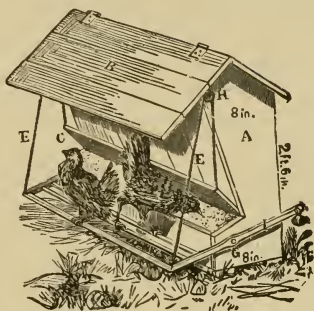


A GOOD FORM OF FOUNTAIN.

Feed boxes are made on the same general principle, a box narrowing to the bottom, and with an orifice large enough to allow a free flow of grain, and resting near enough the bottom of the feeding box so that but little will be given down at a time. Slats sufficiently wide apart so the fowls can feed through them, also keep the poultry from wasting the grain.

A Perfect Hopper.—The best form of feeding hopper is shown in the annexed cut; it can readily be constructed by any person by aid of the following description with references: *A*

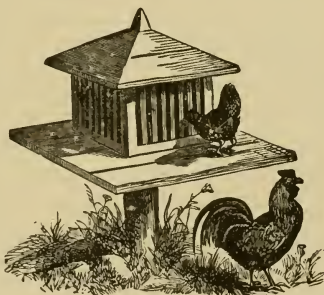
—An end view, eight inches wide and two feet six inches high. *B*—The roof, three feet long, projecting over the perch on which the fowls stand while feeding. *C*—The lid of receiving manger raised, exhibiting the grain. *E, E*—Cords attached to the perch and lid of manger or feeding trough. *I*—End bar of perch, with a weight attached to the end to balance the lid, otherwise it would not close when the fowls leave the perch. *H*—Pulley. *G*—Fulcrum. The hinges at the ridge are for raising the top when the hopper is to be replenished. When a fowl desires food, it hops upon the bars of the perch and the weight of the fowl raises the lid of the feed box, exposing the grain to view, and after satisfying its hunger jumps off and the lid closes. Of course the dimensions can be increased as desired.



A PERFECT FEEDING HOPPER.

A Rat-Proof Hopper.—A stool hopper—as shown in the annexed cut—inaccessible to rats may be built by the following directions: Make a

platform two or three feet square, as the case may be; then make a square box, three inches high and sixteen inches square; nail it in the center of the platform; saw strips one and a quarter inch square and eighteen inches high for the posts; nail strips of boards, two inches wide, to the posts at the top to secure and steady them; then take common lath or any thin stuff, one and a half or two inches wide, and nail them to the top and bottom, up and down, leaving spaces of two inches between the slats, so that the fowls can get at the feed. The roof may be



A STOOL FEEDING HOPPER.

four-square, as shown in the cut, and detached so that it can be raised for the hopper to be replenished with grain. Elevate the hopper on a post about three feet from the ground, as shown in the cut, which makes it rat and mice proof. The fowls will soon learn to leap upon the platform and feed from the grain box between the slats.

XV. Breeds for Market.

The Dorkings are superior table fowls ; they are, however, rather tender and hard to rear, and have not gained special favor in the United States. The Dominiques are hardy, good layers, and good table fowls ; the Plymouth Rocks are larger, and perhaps better if you have the stock. A Dominique cross on Brahmas or Cochin Chinas, will give chicks that grow fast, feather well, and make plump fowls. A Dorking cross on the large Asiatic breeds, is regarded in England as excellent. All things considered, we think the Brahmas and the Cochins will give the best results, and the Brahmas especially are good winter layers. In this, however, every breeder will have his own fancy. The Houdans and La Fleche are in good repute among breeders, but the price of the original stock must, of course, be taken into consideration.

XVI. Breeds for Eggs.

As laying fowls simply, we have found the Polands all that could be desired. The Leghorns, Houdans, Hamburgs and Black Spanish are fully as good layers, and all of them are non-sitters ; but the Leghorns and the Hamburgs have the reputation of being tender, and the Spanish are decidedly so. The Houdan and La Fleche have hardly been tried sufficiently in this country to warrant a decided opinion as to their true value.

XVII. How to Fatten.

The fattening of poultry, if they are in good flesh to start with, does not take long. In fact the bulk of the chickens marketed are taken direct from the yards without extra feeding. This is bad economy. Fifteen to twenty days' feeding, if they are confined in a dark place, will render them fat. When fat, market immediately, since they will soon begin to shrink. Market when they cease to feed full. Corn meal, made into a thick mush, with as much additional meal as can be worked in while boiling hot, and allowed to cool, is the best feed. Put the fowls in coops so small that they cannot turn round, and feed three times a day, allowing to take what water—skimmed milk is better—and clean gravel they will. The last week omit the gravel, and keep the pens clean and well littered with straw all the time.

XVIII. Killing and Dressing.

Let the fowl fast at least twelve hours before killing. No man ever made money by selling a fowl with half a pint of raw corn stuffed in the crop. Tie the legs of the fowl together, hang it up, open the beak, pass a sharp thin-bladed knife, into the mouth and up into the roof,

dividing the membrane; thus the bird is killed instantly. Then deftly cut the throat and let it bleed. The nicest way to pick, is without scalding and while the bird is quite warm. It may be easily done and the bird not torn; thus dressed it will bring enough more in a city market to pay the extra trouble.

To Scald a Fowl.—A well known buyer and dresser for the Chicago market, in answer to the question, how to dress and pack, gave the writer the following information which is here reproduced:

Have the water just scalding hot—*not boiling*—190 degrees is just right. Immerse the fowl, holding it by the legs, taking it out and in, until the feathers slip easily. Persons become very expert at this, the feathers coming away by brushing them with the hand, apparently. At all events, they must be picked clean. Hang turkeys and chickens by the feet, and ducks and geese by the head to cool. Under *no* circumstances whatever, should ducks and geese be scalded; they must invariably be picked dry. Take off the heads of the chickens as soon as picked, tie the skin neatly over the stump, draw out the insides carefully, and hang up to cool. Never sell fowls undrawn. They will bring enough more drawn and nicely packed, with the heart, gizzard and liver placed inside each fowl, to pay for the trouble. Let them get thoroughly cool—as cold as possible—but never, under any circumstances, frozen. There is always money in properly prepared poultry; the money is lost in half fitting them for market, the fowls often being forwarded in a most disgusting state. There is money in the production of eggs; there is money in raising poultry for the market. The money is lost in improper packing, and in a foolish attempt, occasionally made, to make the buyer pay for a crop full of musty corn, at the price of first-class meat.

XIX. Packing and Shipping to Market.

The poultry, having been killed as directed, carefully picked, the heads cut off, and the skin drawn over the stump and neatly tied—or if preferred, leave the head on, the fowl will not bring less for it—and the birds chilled down to as near the freezing point as possible, provide clean boxes and place a layer of clean hay or straw quite free from dust, in the bottom. Pick up a fowl, bend the head under and to one side of the breast bone, and lay it down flat on its breast, back up, the legs extending straight out behind. The first fowl to be laid in the left hand corner. So placed, lay a row across the box to the right, and pack close, row by row, until only one row is left, then reverse the heads, laying them next the other end of the box, the feet under the previous row of heads. If there is a space left between the two last rows, put in what birds will fit sideways. If not, pack in clean, long straw, and also pack in straw at the

sides and between the birds, so they cannot move. Pack straw enough over one layer of fowls, so that the others cannot touch, and so proceed until the box is full. Fill the box full. There must never be any shaking, or else the birds will become bruised, and loss will ensue. Many packers of extra poultry place paper over and under each layer before filling in the straw. There is no doubt but that it pays. Nail the box tight; mark the initials of the packer, the number of fowls and variety, and mark plainly the full name of the person or firm to whom it is consigned, with street and number on the box. Thus the receiver will know at a glance what the box contains, and does not have to unpack to find out.

XX. Glossary of Terms Used by Poultry Fanciers.

Beard.—A bunch of feathers under the throat of some breeds, as Houdans or Polish.

Breed.—Any variety of fowl presenting distinct characteristics.

Brood.—Family of young chickens.

Broody.—Desiring to sit.

Carriage.—The attitude or bearing of a bird.

Carunculated.—Covered with fleshy protuberances, as on the neck of a turkey-cock.

Chick.—A newly-hatched fowl, until a few weeks old.

Chicken.—Applied to indefinite ages until twelve months old.

Clutch.—Given to the batch of eggs under a sitting hen, also to brood of chickens hatched therefrom.

Cockerel.—A young cock.

Comb.—The red protuberance on top of the fowl's head.

Condition.—The state of the fowl as regards health, beauty of plumage—the latter especially.

Crest.—A tuft of feathers on the head; the top-knot.

Crop.—The receptacle for food before digestion.

Cushion.—The mass of feathers over the tail and end of the hen's back, covering the tail; chiefly developed in Cochins.

Deaf-ears.—Folds of skin hanging from the true ears, varying in color, being blue, white, cream-colored, or red.

Dubbing.—Cutting off the comb, wattles, &c., leaving the head smooth.

Ear-lobes.—Same as deaf-ears.

Face.—The bare skin around the eye.

Flights.—The primary wing feathers, used in flying, but unseen when at rest.

Fluffs.—Soft, downy feathers about the thighs.

Furnished.—Assumed full character. When a cockerel obtains his tail, comb, &c.

Gills.—A term applied to the wattles, sometimes more indefinitely to the whole region of the throat.

Hackles.—The peculiar narrow feathers on the fowl's neck.

Hen-feathered, or *Henny*.—Resembling a hen, in the absence of sickles.

Hock.—The elbow-joint of the leg.

Keel.—A word sometimes used to denote the breast bone.

Leg.—The scaly part, or shank.

Leg-feathers.—The feathers on the outside of the shank.

Mossy.—Confused in marking.

Pea-comb.—A triple comb.

Penciling.—Small stripes over a feather.

Poult.—A young turkey.

Primaries.—The flight-feathers of the wings, hidden when the wing is closed.

Pullet.—A young hen.

Rooster.—The common term for the male bird.

Saddle.—The posterior of the back, reaching to the tail in a cock, answering to the cushion in a hen.

Secondaries.—The wing quill-feathers, which show when the bird is at rest.

Self-color.—A uniform tint over the feathers.

Shaft.—The stem of a feather.

Shank.—The scaly part of the leg.

Sickles.—The top curved feathers of a cock's tail.

Spangling.—The marking produced by each feather having one large spot of some color different to the ground.

Spur.—The sharp weapon on the heel of a cock.

Stag.—Another term for a young cock.

Strain.—A race of fowls, having acquired an individual character of its own, by being bred for years by one breeder or his successors.

Symmetry.—Perfection of proportion.

Tail-coverts.—The soft, glossy, curved feathers at the sides of the bottom of the tail.

Tail-feathers.—Applied to the straight, stiff feathers of the tail only.

Thighs.—The joint above the shanks.

Top-knot.—Same as crest.

Trio.—A cock and two hens.

Under-color.—The color of the plumage as seen when the surface is lifted.

Vulture-hock.—Stiff projecting feathers at the hock-joint.

Wattles.—The red depending structures at each side of the base of the beak.

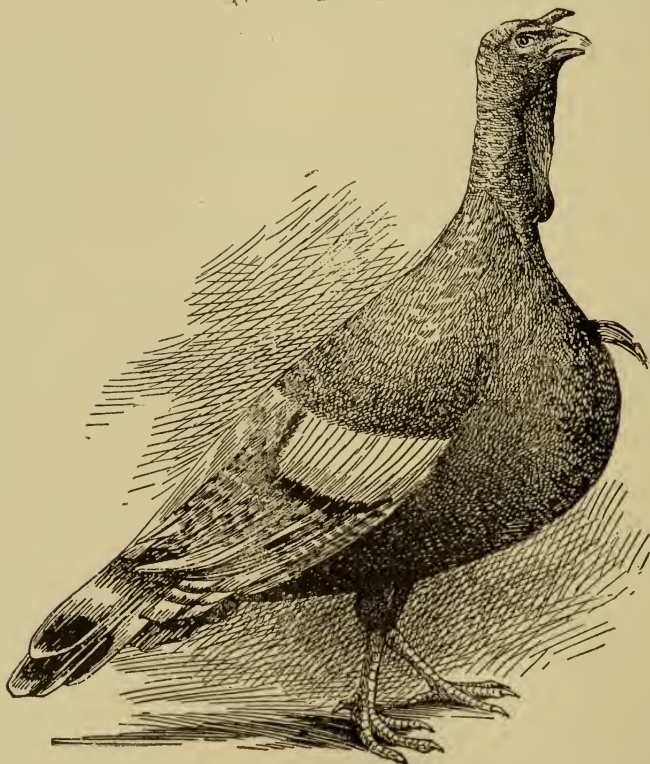
Web.—Expressing a flat and thin structure. The web of a feather is the flat or plume portion; the web of the foot, the flat skin between the toes; of the wing, the triangular skin, seen when the member is extended.

Wing-bar.—Any line of dark color across the middle of the wing.

Wing-bow.—The upper or shoulder part of the wing.

Wing-butts.—The corners or ends of the wing. Game fanciers denote the upper ends as shoulder-butts; the lower as lower-butts.

Wing-coverts.—The broad feathers covering the roots of the secondary quills.



THE NARRAGANSETT TURKEY—MALE.

CHAPTER VIII.

THE TURKEY, AND ITS VARIETIES.

I. VARIETIES OF THE DOMESTIC TURKEY.—II. THE BRONZED-BLACK TURKEY.—
III. THE COMMON TURKEY.—IV. THE OCELLATED TURKEY.—V. ENGLISH
TURKEYS.—VI. RARE VARIETIES.—VII. THE CARE OF TURKEYS.

I. Varieties of the Domestic Turkey.

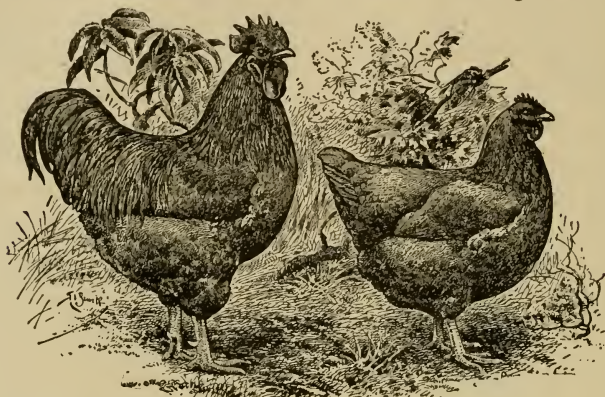
Notwithstanding the length of time that the wild turkey has been domesticated—over 300 years—it still retains some of its wild habits, even under the most artificial conditions. This is undoubtedly due to the fact that the turkey endures close confinement to a less extent than any of the domestic land birds, and hence these traits of wildness, wandering and the hiding of nests and young, have not been entirely bred out. The same is true of the pheasants, still less domesticated, although they have been in more or less subjection to man since ancient times.

All turkeys, whether of the wild or domestic varieties, breed freely, one with the other, and continue fertile, thus proving conclusively that they came originally from one species. They are now broken up into every color, black-bronzed and white-mottled being the original wild color. Among the sub-species, are: The Common turkey; Black-and-white-mottled; Black-bronzed; the Mexican; the Ocellated or Honduras; the White; the Buff; the Fawn-colored; the Copper-colored, and the Parti-colored. Temminck, in 1813 described Isabelle yellow turkeys, with fine full crests of pure white. Lieutenant Byam described crested wild turkeys as seen by him in Mexico; it is probable that this observer mistook curassows for turkeys, since this bird is domesticated there and nobody else has found crested turkeys in Mexico.

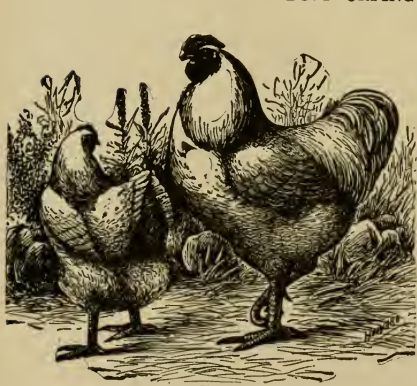
II. The Bronzed-Black Turkey.

This variety is said to have been produced by a cross of the Wild turkey upon the Common turkey hen, the produce fixed and improved by careful selection and breeding. They are the largest, as they are undoubtedly the best, of the domestic varieties. The average for mature birds, well fattened, is about thirty pounds, while forty pounds is not uncommon for extra male birds. The hens will weigh from twenty to twenty-five pounds each, when mature. They are as hardy as they are beautiful in plumage.

The best specimens are described as follows: In the cock, the face, earlobes, wattles and jaws are deep rich red, the wattles warted and sometimes edged white, the bill curved, strong, of a light horn color at the tip and dark at the base. The neck, breast and back black, shaded with bronze, which in the sunlight glistens golden, each feather ending in a narrow glossy black band extending clear across. The under part of the body is similarly marked, but more subdued. The wing-bow is black,



BUFF ORPINGTONS.

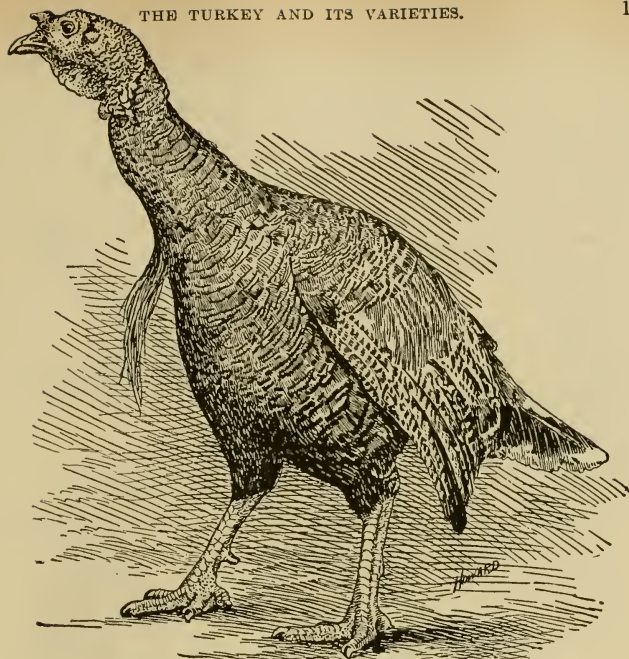


A PAIR OF WHITE WYANDOTTES



A SILVER-LACED WYANDOTTE PULLET

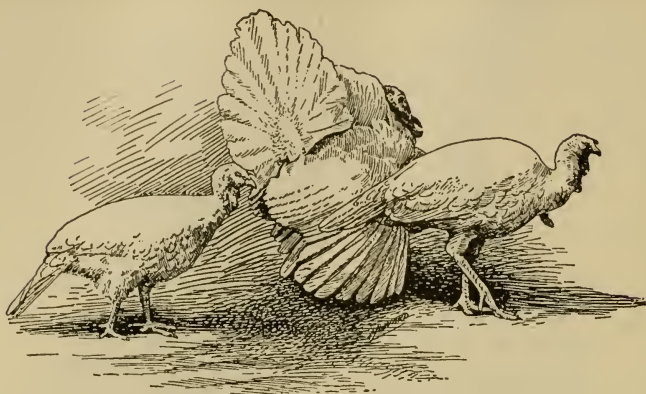
showing a brilliant greenish or brown lustre, the flight-feathers black, barred across with white or gray, even and regular; the wing-coverts rich bronze, the end of each feather terminating in a wide black band, giving the wings, when folded, a broad bronze band across each; tail black, each feather irregularly penciled with a narrow brown band, and ending in a grayish-bronze band. Fluff abundant and soft; legs long, strong, dark or nearly black. The hen is similarly colored, but more subdued.



YOUNG BRONZE TURKEY—MALE.



BUFF TURKEYS



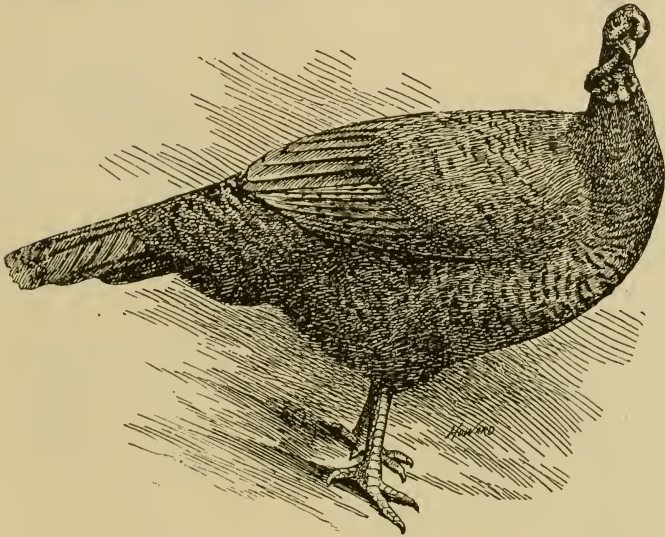
WHITE TURKEYS



ADULT BRONZE TURKEY—MALE.

III. The Common Turkey.

The common turkey is white and black mottled, having the head and wattle of the wild turkey. They are of medium size, and, probably from the fact that they have been more generally disseminated and longer domesticated than the other varieties, they are less inclined to wander.



SLATE TURKEY HEN.

When simply dollars and cents are concerned, they are the most profitable to breed, since they are hardy, of medium size, and mature early. They will weigh, fat, at eight months old, from eleven to twelve pounds, and, when fully grown, sixteen pounds.

IV. The Ocellated Turkey.

This is one of the most elegant of the whole genus; it is a native of Central America, and is found wild all over that region. It breeds kindly with our domestic turkey, and the progeny remains quite fertile, but both the true and cross breed are too tender for the North. Our bronzed green and gold turkeys undoubtedly owe their markings to this variety. The ground color of the plumage of the Honduras, or Ocellated turkey, is bronzed-green, banded with gold-bronze and shining black; lower down the back the color is deep blue and red; upon the tail the bands become fully defined and sharp, producing the peculiar ocellated or eye-like ap-

pearance, whence their name. The wattle is also peculiar, and the top of the head is covered with wart-like protuberances, as shown in the cut of a young Ocellated hen.



YOUNG OCELLATED TURKEY HEN.

V. English Turkeys.

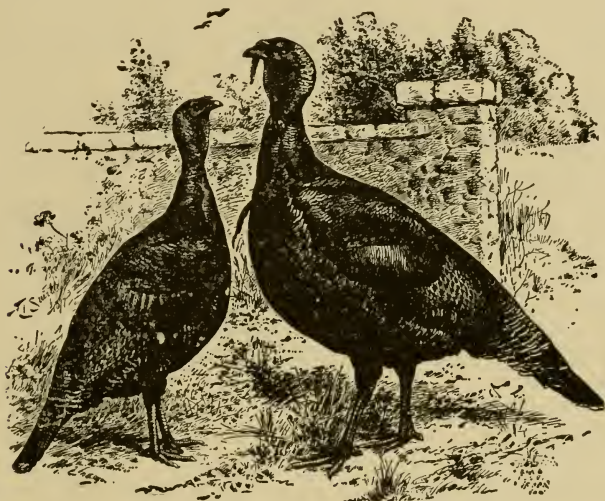
The so-called English turkey is simply a sub-variety of the common American domesticated turkey already described. Careful breeding and selection have increased the size and rendered them quite uniform in color. One sub-variety is the Norfolk turkey, black with a few white spots on the wings. Another sub-variety, valued in Cambridgeshire, is bronze-gray, and longer-legged than the Norfolk; these, however, vary from a light copper color to dark, the latter being preferred.

VI. Rare Varieties.

There are a number of more or less rare varieties of turkeys, the Buff, the Fawn, and the Pure-white being the principal ones. They are all considered more tender than the varieties heretofore named. Turkeys of the white variety are especially handsome, the color being relieved by the tuft on the breast, which remains jet black, which, with the blue-white and red caruncles of the head and neck, present a most elegant appearance.

VII. Caring for the Turkey.

There are almost as many ways and methods of feeding as there are localities where turkeys are grown. A considerable number who allow



A PAIR OF BRONZE TURKEYS.

their turkeys a good deal of freedom will succeed; others do equally well who follow methods quite the reverse. Some never house the mother hen or the young, while others house them both.

While our present-day turkeys are classed as "domestic fowls," they are rather semi-domestic when compared with other poultry. For this reason the treatment given them must differ from that given to hens and chickens, and houses or coops that will serve for the latter will be clean and dry for the poults; it may not meet the wants of the turkey hen. She must have a house or box in which she can stand erect and stretch

her neck and look about. The floor of this must be of boards, but dry, clean earth is best for both the hen and the poults. This natural environment has a beneficial influence upon the mother and the young turkeys. It adds to both health and spirits, and helps to develop constitutional vigor.

Satisfactory results can never be secured by handling turkeys like cage birds or hothouse plants. Avoid overdoing the care and attention. Treat them like turkeys, and use common sense in looking after them. Their native home was in the woods and fields; in their present semi-domestic condition they need more shelter and care, but they should never be shut in so close as to deprive them of plenty of light, room, and air. They should not be pampered and fed upon unnatural foods; neither should they be over-fed at any time. In their wild state they ran about here and there, seeking small grains, seeds, and bugs, getting plenty of exercise as well as food. Their domestic condition deprives them of the necessity of hunting for their food, and consequently of the exercise that comes from so doing.

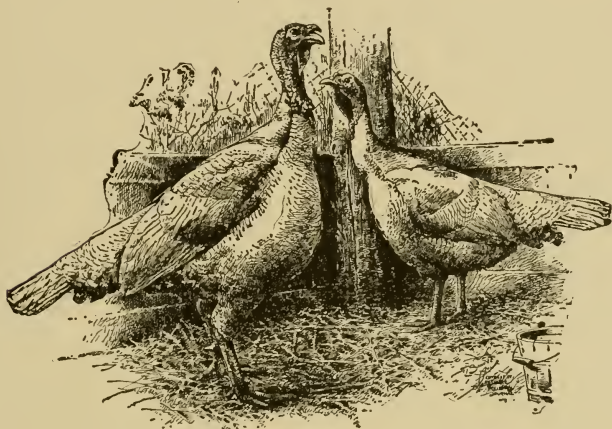
When quite young, the poults are apt to receive more attention than they need. Then, as they grow older and the novelty of attending to them wears off, they are too often neglected just at the time when more care should be given to them. For instance, when their feathers are growing and the unusual heat overcomes them, special care may profitably be bestowed; again, the same is true when the frost destroys their natural food supply in the fall. Thousands are lost at these critical periods from lack of a full food supply.

An open coop, made of slats or lath, may be placed over the mother turkey just prior to the hatching of her eggs, as this will prevent her wandering away with her young when they are hatched. It may be covered on top with tar paper as protection from rain or sun. Such open coops are frequently used in turkey-growing districts, and those who use them could not be induced to change. They should be large enough to provide plenty of space for the mother turkey. Quite often a box too small for the hen to turn about or to stand erect in is used for a coop for the hen and poults. This annoys her and she becomes restless, tramps about, kills her young, and is blamed for taking bad or indifferent care of her offspring, when more than likely, if she had room to move about, she would be a model mother for the poults.

In a suitable coop, the brood of young turkeys can stay for a day or more in comfort, sheltered from wet and storm or cold, with space enough to move about. In such a coop the very young poults can stay while the mother goes about on the outside for exercise. To have this use the coop when the hen is out, set up in slides inside the door a piece of board a foot wide; this will keep the poults safe from the hot sun or the wet much better than will the triangular pen so often made of three boards.

Almost any kind of pen, coop, or house will do for the turkey hen and poults if it will protect them from rain and storms, if it is large enough, is clean, not too close or warm, and absolutely free from parasitic enemies. These are the important requisites of the structure in which they are to be kept until the poults are well started. They should be allowed their freedom a part of every day when the grass is dry, and should be made to stay within at nights and during wet days, till old enough to wander with the mother hen and roost out on the fences or trees.

Either fresh coops should be provided each year or the old ones should be thoroughly cleansed within and without. Prior to using old coops,



A PAIR OF WHITE HOLLAND TURKEYS.

paint them thoroughly with crude petroleum, in which have been dissolved some naphthalene balls, filling every crack and crevice with this at least a week before they are needed, and be sure that the odor of the preparation has disappeared before using the coops, as it is not beneficial to the young. The features of most importance in cooping the mother and young are plenty of light and room, and freedom from dampness and insect parasites.

When the poults are ready to leave the nest, move the mother hen and her young into the coop provided for them; supply a little food now and then as they need it, and see that the mother has plenty of food and water. Let them alone in the coop till they begin to move about. As soon as they will, let the poults run out on the grass when it is dry, but keep them from the wet grass, as nothing is more detrimental to their growth, unless

it be insect parasites. As they advance give them a more plentiful food supply, and guard against any possibility of lice infesting them.

While they are young special attention must be given to protection from the direct rays of the sun, exposure to which wilts them completely. At times they will reel under its influence as though suffering from sun-stroke, or move about with slow steps, weakly dragging one foot after the other, while giving forth a feeble peep that sounds the warning of their approaching end. The blood-sucking parasite has much the same effect upon them when present. When under the influence of both at the same time, the chance of survival is small indeed.

Have a dry spot where the young poults may run and exercise. This may be provided by spreading a load or two of coarse sand near the coops, which will furnish a dry foothold, no matter how wet or damp the grass may be. To keep this in sanitary condition go over it once a day with a fine-toothed rake, in order that the sun may dry it thoroughly. When the young turkeys are suitably housed, properly fed, and kept free from lice, they are quite as easy to grow as young chickens.

A thorough investigation of the methods of feeding young turkeys shows to what extent general rules already cited are followed. While all who succeed seem to adopt nearly the same methods, there are a few differences worthy of consideration. Some feed bread and milk in a saucer as soon as the poults will eat, while others soak bread and milk and squeeze it dry before feeding; some adhere closely to an absolute grain diet, while others feed everything they imagine the poults will eat.

It should never be forgotten that in the wild state their foods were the bugs, worms, seeds, etc., which they could find for themselves, and which were hunted for and scrambled after continually. There was then no overfeeding upon rich, unnatural foods that impaired health and produced bowel troubles or other ailments that naturally follow unwholesome food. They subsisted by their own efforts in the wild state, while now they are quite too often forced to eat unnatural foods that are furnished in hope of forcing them to an unnatural growth. If the grower wishes to copy nature as nearly as possible, the young poults may be given for their first meal very fine oatmeal or finely cracked wheat or corn, with a little fine grit of some kind and a very little granulated meat scrap. Some of the commercial brands of "poultry food" are also good. They should have clean water convenient where they can help themselves at will.

As a general rule, do not feed them wet food or slops. Poults are seed-eating chicks, not slop eaters. Bread and milk, however, contains elements most valuable in the growing of all kinds of fowls. This food should be considered, when properly given, as one of the best kinds of food for the first day or two. Soak stale bread in sweet milk, press out the milk as completely as possible, and feed the bread to the young poults. Be careful never to use sour milk, nor should the bread thus prepared

ever be fed after it has become sour. Feed this, a little at a time, every hour or two for two days or more; then add a little hard-boiled egg, shell and all broken fine, to the soaked bread.

After a day or two on this ration, follow with the ration of finely broken grain already described, and include a little finely cut meat. Make sure that the meat scrap is pure and sweet. Nothing is more injurious to the poults than tainted or infected meat of any kind, as it will disturb their bowels in a very few hours and cause great trouble. Lean beef, well cooked and cut into very small fragments, is good. Be very cautious about feeding green meat or bone. If any of this is fed, have it cut quite fine, giving but little at first, and be absolutely certain that it is fresh and sweet. Cooked meat is better for them while young.

Coarse sand is excellent for grit, and if sufficient of this is at hand no other grit will be needed; but plenty of grit of some kind is a necessity, for without it the poults cannot grind their food.

Food should be given them quite early in the morning, and at frequent intervals during the day. Never overfeed them, but use discretion in providing plentifully for their necessities. Give them all they will eat willingly, and no more. Avoid the use of rich foods, grains in hulls, and millet seed, which is not good for them while they are young; a little of this seed, however, may be fed as they grow older. Too much hard-boiled egg is bad for them, while a reasonable amount with bread is beneficial. An excess has a tendency to clog and congest the bowels, and the writer has seen poults die from the effects of a diet exclusively of egg and millet seed. The same injurious effect may be produced by feeding entirely with milk curds.

Bowel trouble must be considered as an assured result of improper feeding, and may be aggravated by exposure to cold and dampness. Indigestion is a prime factor in the development of this ailment that kills so many turkeys while young. This should be prevented as far as possible by the feeding of finely broken charcoal, which is a safeguard against fermentation in the crop or gizzard, thus aiding digestion. This looseness of the bowels should not be mistaken for cholera. It may usually be relieved by feeding rice that has been boiled almost dry in milk.

Too much stress cannot be laid upon the practice of hand feeding. The turkey hens are not so attentive to their young as chicken hens. If all who grow turkeys would pay special attention to hand feeding of the poults as soon as they are hatched, much benefit might be gained. To be successful with hand feeding, one must take the food between the fingers and thumb, patiently hold it to the beak of the young turkey, and try to induce it to eat. This method of feeding tames and quiets the young poults, gives them a good start, and prevents the possible contamination of the food by being thrown upon the ground. Although

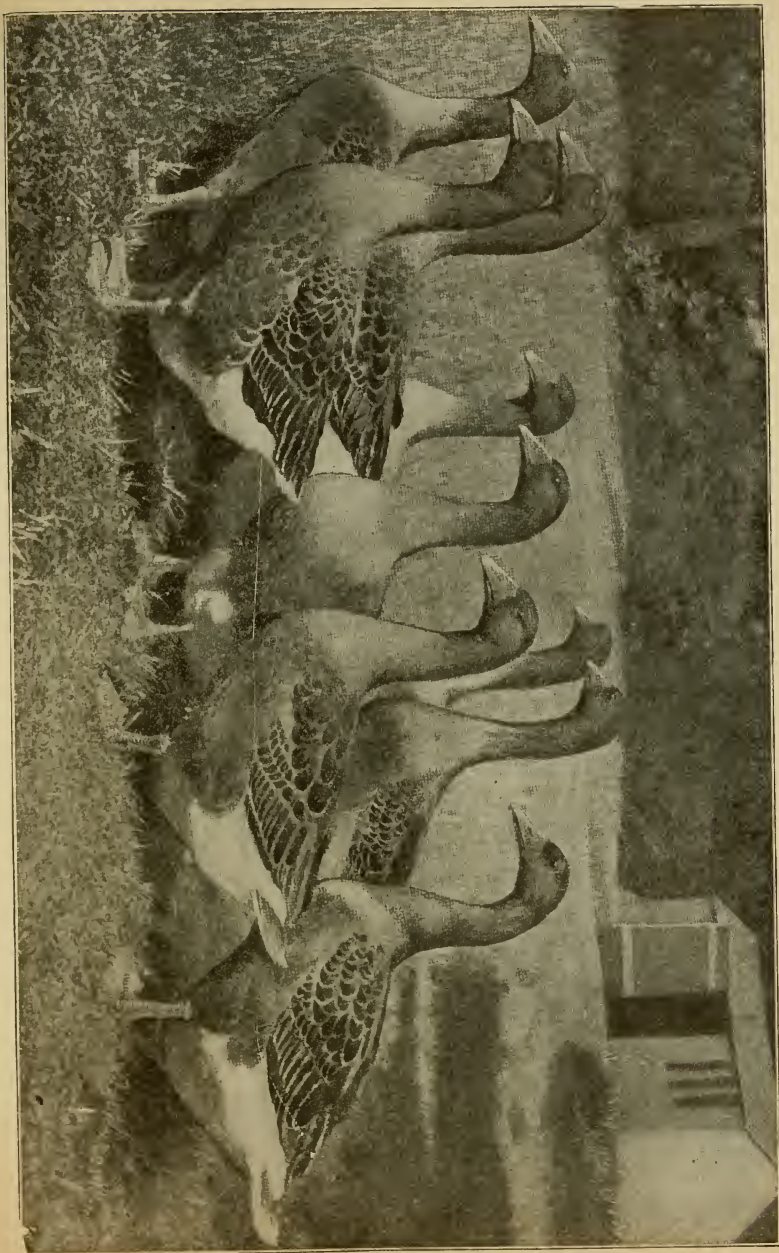
feeding in this manner may appear to involve considerable labor, the resulting benefits are often far in excess of the time and effort expended.

After three weeks the poults may have whole wheat, hulled oats, cracked corn, and a little millet seed, in addition to their other food. Many young turkeys are lost when partly grown, particularly during wet weather after they have been given liberty to roam at will. Much loss may be avoided by going after them wherever they may be and feeding them a little once or twice a day. This plan should be followed during continued wet weather, no matter how far advanced they may be. A continuous wet spell deprives them of the greater part of the bugs and worms they feed upon, and the wet grass, by retarding their motion, tends to reduce vitality. Go after them during such weather and feed them, so as to prevent the bad results that must follow a scarcity of food at such times. Flocks of young turkeys that wander continually should be fed at least once a day, if only a little, to keep them quiet or tame. If fed at least once a day on grain, they will grow faster, mature earlier, and make better size than if not fed at all. Those who make use of these methods secure the best results.

One of the most successful growers in the country feeds the young poults at the start oatmeal, broken wheat, and finally cracked corn; as they grow older whole wheat, hulled oats, and coarser cracked corn, and still later, whole grains of corn. When running at large they are taught to come close to the barns twice a day for food. Following these and similar methods enabled him to bring to maturity, during the unfavorable season of 1903, over 300 white turkeys out of about 335 that were hatched.

Hulled oats are used to avoid the injurious effects that arise from feeding oats in the hull, the sharp portions of which are apt to prick and irritate the crop. No more nutritious grain can be fed to growing poults than hulled oats. Wheat and whole or broken corn will do as they grow older, but oats should be added whenever practical. If hulled oats cannot be had, use clipped oats, boiled; drain them thoroughly, and feed when cold. Always select plump, heavy oats, with a large percentage of kernel.

Nothing equals good, sound grain of all kinds for feeding the growing turkeys. Do not use poor, shriveled, or musty grain of any kind. It is a mistaken notion that it will pay to feed inferior grain to any kind of growing fowl. It is a loss of both time and money to do so, as nothing but disappointment can result from its use. The best results always come from having the best quality of stock and giving it the best food and care.



A GROUP OF GRAY TOULOUSE GESE.

WATER FOWL.

CHAPTER IX.

GEESE AND THEIR VARIETIES.

- I. THE MANAGEMENT OF GEESE.—II. EMBDEN OR BREMEN GEESE.—III. TOULOUSE GEESE.—IV. WHITE CHINESE GEESE.—V. HONG KONG GEESE.—VI. THE AFRICAN GOOSE.—VII. THE CANADA OR WILD GOOSE.—VIII. EGYPTIAN GEESE.

I. The Management of Geese.

The management of geese is very simple. A good dry spot for their resting place, plenty of range, with young grass, and a pond, or running water, if possible, will enable any one to raise geese successfully, if plenty of grain, corn and wheat screenings are given to make up what they fail to get in their rambles. The grain fed should always be given in a deep vessel of water in summer, if deep natural water is not near, since geese are often annoyed by insects getting in the ears and nostrils, which they rid themselves of by thrusting their heads well down into water.

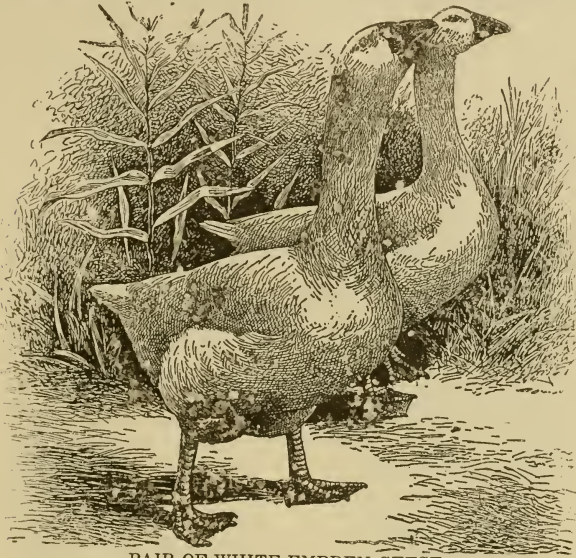
In fattening for market, corn-meal and potatoes boiled together to a thick mush, is as good as anything. They should be sold as soon as fat, which should be in about two weeks of feeding. If the mush is made with skimmed milk the geese will become very fat, if given as much as they will eat three times a day.

Geese are subject to but few diseases. For diarrhœa, give one or two drops of laudanum in a little water, and repeat if necessary. For giddiness bleed them in the prominent vein which separates the claw. Geese live to a great age, and old geese are the best mothers. Ganders, however, are best at from one to three years old, since as they get age they are apt to become cross, and sometimes injure small children.

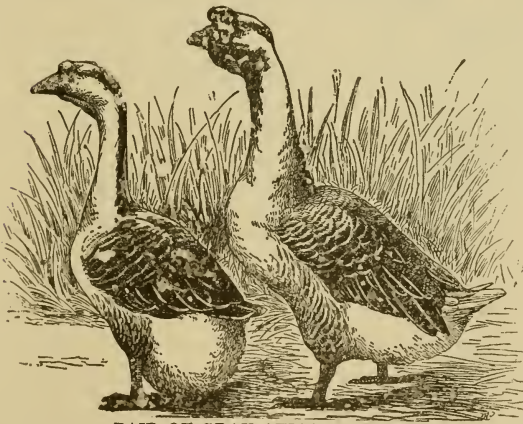
II. Embden or Bremen Geese.

There is no doubt but the Embden is the most valuable of the domesticated varieties of geese. They should be pure white, with prominent blue eyes; strong, medium-length neck; heavy bodies, with the feathers

rather more inclined to curl from the shoulder to the head, than in other varieties; the bill is dark flesh color and the legs orange. Young birds of the year have been made to weigh over forty pounds, and mature birds



PAIR OF WHITE EMBDEN GEESSE.

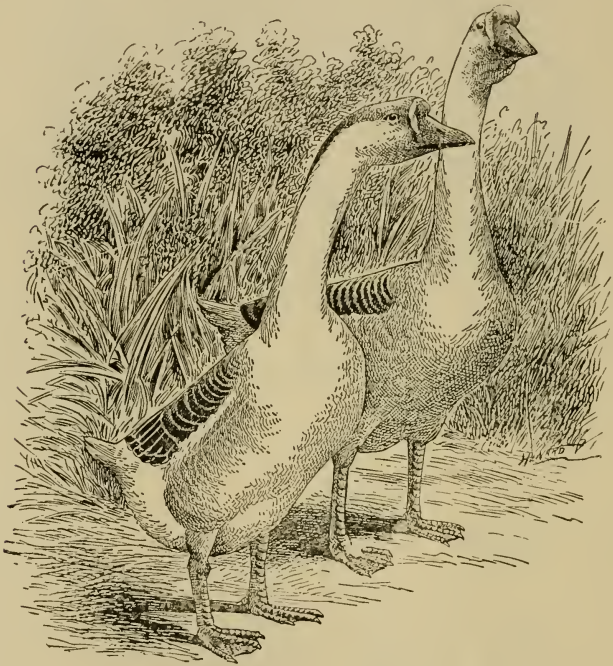


PAIR OF GRAY AFRICAN GEESSE.

near sixty pounds. The average for breeding birds may be put at about twenty pounds. They are early layers and may be made to rear two broods in a season.

III. Toulouse Geese.

These magnificent birds, next in merit to the Embden, and by many fanciers preferred to them, have compact bodies, rather short legs, and will often outweigh the Embdens. Their bodies and breasts are light gray; the neck dark gray, the color deepening as the head is approached: the wings are colored like the neck, but getting lighter towards the belly,



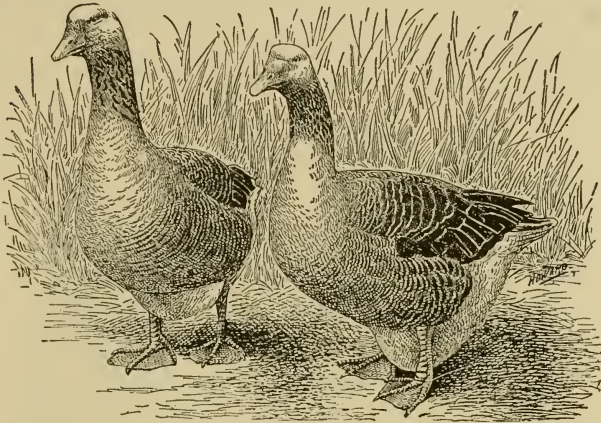
PAIR OF YOUNG BROWN CHINESE GEESSE

which, together with the rump, is white. The legs and feet are a deep reddish orange, and the bill the same color, but inclining to brown. In quality of flesh there is little if any difference between the Embden and the Toulouse.

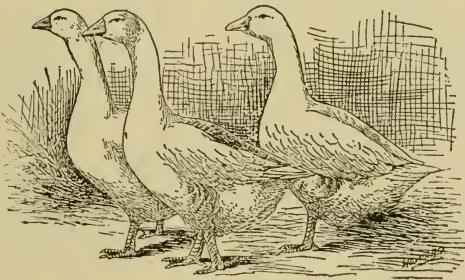
IV. White Chinese Geese.

The White Chinese geese, from their immense size, pure white color, and swan-like appearance are much admired by fanciers who have ponds of water. Whether swimming or on land, they are pleasing and graceful

in movement. The color is pure white; the bill and the knob on the head orange colored, and the color of the legs the same. A peculiarity of this breed is the great disparity in size between the males and females,



PAIR OF GRAY TOULOUSE GEESSE.



EMBDEN AND AFRICAN CROSS.

the former being one-third larger than the latter. They are prolific of eggs, which are rather small-sized for the size of the birds, and the goslings are tender and delicate in flesh. They are hardy and prolific, sometimes rearing three breeds in a season.

V. Hong Kong Geese.

The Hong Kong, or gray China goose, is supposed to be the variety from which the White Chinese goose sprung. Certainly, there are not greater differences between the two than between the Embden and Toulouse. The Hong Kong is distinctly knobbed, and in size is between a goose and swan. Their distinguishing marks are the knob on the top of the head, the feathered dewlaps or wattle under the throat, and distinct dark stripe down the neck. They vary in color, but the true color

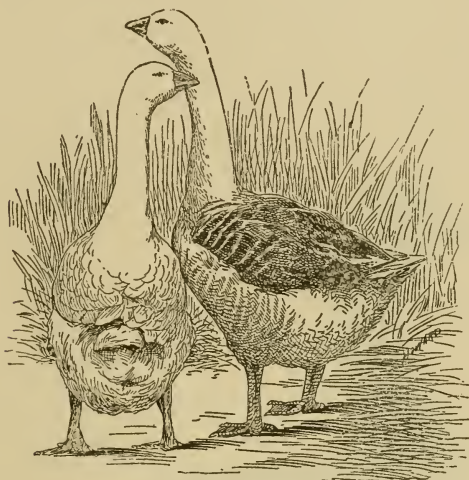


GROUP OF WHITE PEKIN DUCKS.

is a grayish brown on the back and upper parts of the body, changing to white or whitish gray under the abdomen; the neck and breast yellowish gray, with a distinguishing stripe of dark brown running down the back of the neck from the head to the body; the bill and legs are orange, and the protuberances at the base of the lower bill very dark, approaching to black. They are nocturnal in habit, very prolific in eggs, and the flesh of the young birds is superior in quality.

VI. The African Goose.

This is one of the largest of any of the varieties of geese, and is remarkable for its upright carriage, carrying the neck straight and the head level in walking. It is rather a rare bird in the United States, and has sometimes been called the Siberian Goose, but the name African goose is undoubtedly the true one. The bill is hooked or armed with small inden-



EMBDEN TOULOUSE CROSS.

tations along the sides ; at the base of the bill on top is a bright vermillion colored fleshy tubercle, and a hard, firm, fleshy membrane under the throat. The head and upper part of the neck are brown, deeper on the upper side and lighter on the underside. The cut will give a good idea of the principal characteristics of this variety.

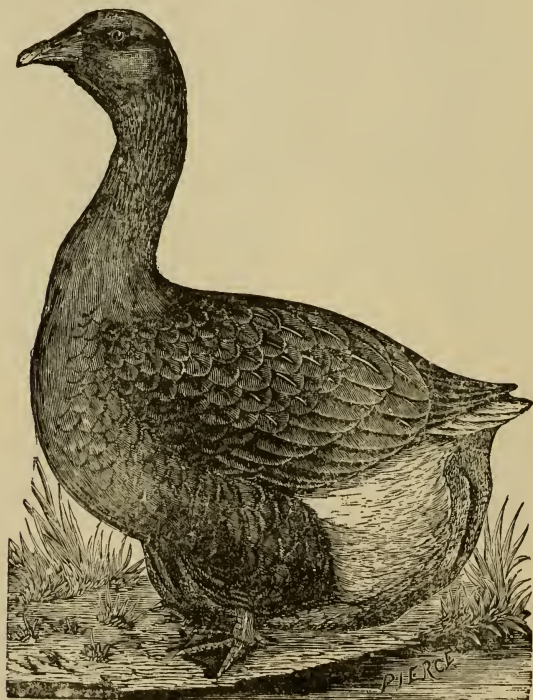
VII. The Canada or Wild Goose.

This goose is well known all over the United States and Canada, breeding in the far North, spending the spring and autumn in the more temperate regions, and going South, even to the Gulf of Mexico, in the winter. It is the most sagacious of any of the goose tribe, and when

hatched from wild eggs, often becomes thoroughly domesticated in the first generation, and breeds freely with the other varieties of geese. When bred on the farm, the flesh retains much of the game flavor of the wild birds. It is certainly one of the handsomest of water fowls.

VIII. Egyptian Geese.

This is a rare variety in the United States, but is prized for its beautiful plumage and stately carriage. It is a small bird, weighing about eight pounds, but elegant and striking in its plumage. The color is dark red around the eyes; the bill white; a red ring about the neck; the neck and breast light fawn gray, with a maroon star on the breast; the belly red and gray; the wing feathers one-half deep rich black, and the rest pure white, with a black bar running across the centre; the back light red, changing to dark red near the tail; the tail jet black.



STANDARD TOULOUSE GOOSE.

WATER FOWL.

CHAPTER X.

VARIETIES OF DOMESTIC DUCKS.

I. DUCKS ON THE FARM.—II. VARIETIES BEST ADAPTED TO THE FARM.—III. AYLESBURY DUCKS.—IV. ROUEN DUCKS.—V. THE COMMON WHITE DUCK.—VI. CAYUGA BLACK DUCKS.—VII. MUSCOVY DUCKS.—VIII. BLACK EAST INDIA DUCKS.—IX. CALL DUCKS.—X. PEKIN DUCKS.—OTHER AND RARE DUCKS.

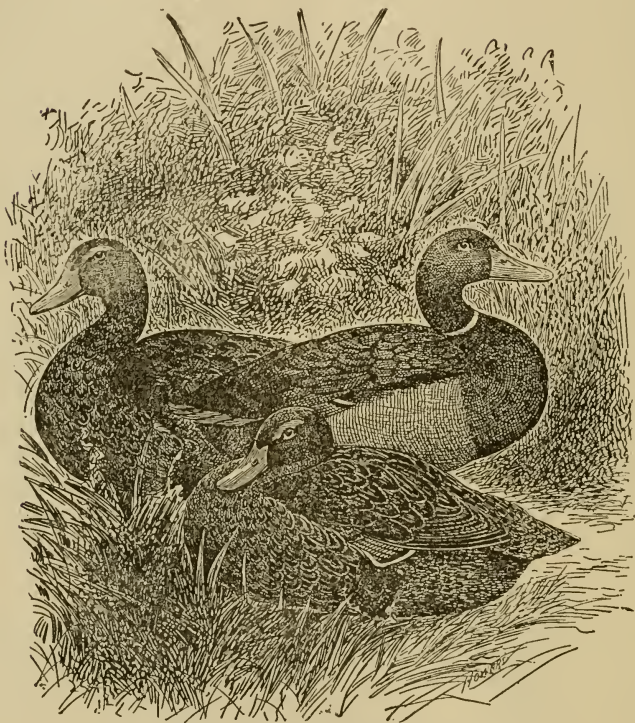
I. Ducks on the Farm.

Year by year both ducks and geese are becoming more popular as an addition to the regular farm stock. Ducks, especially, are yearly receiving more and more attention. First, from the fact that the ducklings are the most active and indefatigable insect hunters known; second, they are more easily reared than any other farm birds; third, their feathers are valuable, and fourth, the eggs and young ducks find ready sale in the markets. In the fields of the market gardener they are especially valuable, and all those who know their value in this respect would raise them if only for their aid in summer as insect destroyers.

II. Varieties Best Adapted to the Farm.

When the flesh and feathers are the principal objects, the white breed are best; but when flesh is the prime object, and handsome, ornamental qualities are desired, the Black Cayuga and the Rouen duck will give satisfaction. We think the young of the Rouen duck the best insect destroyers of any of the large breeds, and the young of the common gray duck, the best of the smaller breeds. The Muscovy, one of the largest of ducks, has really little to recommend it, except size, and even here, the Cayuga, the Rouen and the Aylesbury will nearly compete with them, and are far superior in quality of flesh. One reason, probably, why ducks have received so little attention in the West, is that wild ducks have been so numerous in the spring and fall that a mess might at any time be had for the shooting. They are, however, becoming scarcer

and higher year by year, and hence, except in new settlements near water, more and more attention is yearly being paid to the raising of tame ducks.



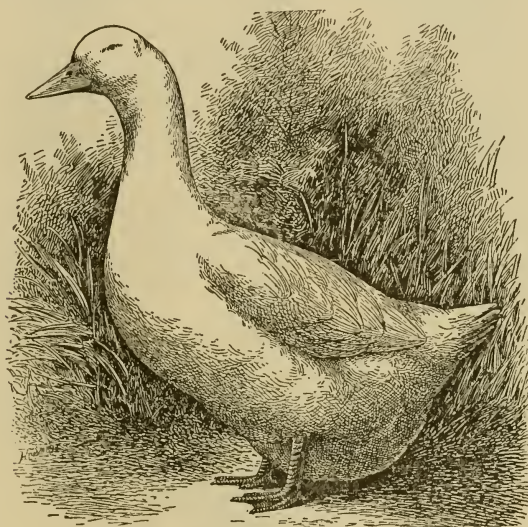
TRIO OF COLORED ROUEN DUCKS.

The raising of ducks is exceedingly simple. They are little liable to disease and are able to take care of themselves soon after being hatched. The mean period of incubation is thirty days. The eggs should be placed under a large hen, light Brahma preferably, and when hatched

they should have a pool of clear water to play in, however small it may be. Their food may be the same as that of young chicks, and if placed where insects abound, they will soon rid the squash, melon, cucumber, or other patches of these enemies of the gardener.

III. Aylesbury Ducks.

Of all the English breeds, the Aylesbury is undoubtedly the best, and, taking into consideration the color of the feathers, it is one of the most useful of the species introduced into the United States. They are scarcely so heavy as the Rouen, but eighteen pounds per pair is not unusual. They are prolific in eggs of pure white color, and quite thin in



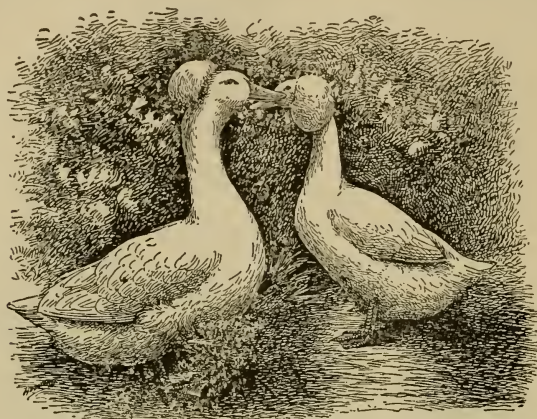
WHITE PEKIN DUCK.

the shell. The Aylesbury is rather inclined to fall down behind from the stretching of the abdominal muscles. In breeding, always avoid such birds, and as soon as it is noticed, kill and dress them for market, since as soon as this becomes the case they are generally sterile. This will apply to all ducks, and hence, in the selection of the male, take those that are especially free from this disability.

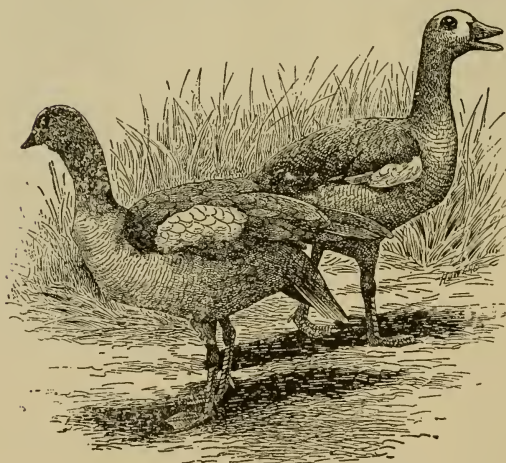
IV. Rouen Ducks.

This name is probably a corruption of Roan duck; at all events there is no evidence that the breed originated at the French town of this name.

It is undoubtedly a variety of the Mallard or Gray duck, and bred together the young come uniform in their markings. The color should closely



PAIR OF CRESTED WHITE DUCKS.



PAIR OF COLORED EGYPTIAN GEESE.

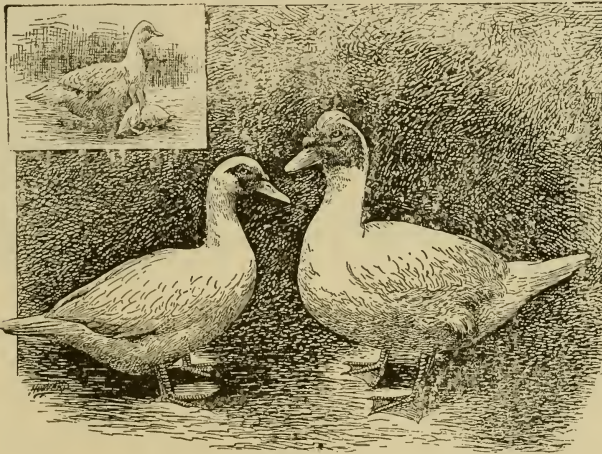
approximate that of the wild Mallard duck. In fact, the markings of the wild duck will perfectly describe the tame, enlarged and improved variety. The eyes, nowever, are more deeply sunken, and they have the

disability of soon falling behind, the abdominal protuberance being developed at an early age.

They are the largest as they are the most quiet of ducks, and seldom wander. When fat, they have been made to weigh nearly twenty pounds the pair, and drakes of nine or ten weeks old have been known to weigh more than twelve pounds the pair. The flesh is most excellent and they are prolific layers of large, rather thick-shelled, bluish-green eggs.

V. The Common White Duck.

This duck is too well known to need description. They are not unlike the Aylesbury, except in size. Since the introduction of the larger breeds, they have fallen into disrepute and are now seldom found pure.

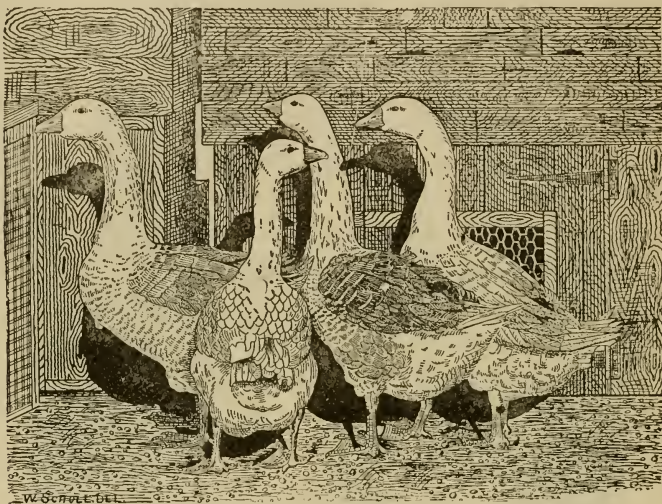


PAIR OF WHITE MUSCOVY DUCKS.

VI. Cayuga Black Duck.

Of the origin of this famous American duck, nothing positive is known. They have been bred about Cayuga lake, New York, for many years. They are essentially a water duck, rarely rising from the water, and so clumsy on land that they seldom wander far. In color they are black, or rather deep brown black, with a white collar about the neck, and white flicks on the breast; the drakes usually show more white than the ducks, and the green tint on the head and neck being far more pronounced; in fact the duck should have but a faint strip of green on the head, neck and wings. In breeding, the darkest males should be selected, since they incline to breed to white. They are good layers, producing about eighty

to ninety eggs in a season when well fed. The flesh is excellent, dark and high flavored, and the birds hardy. The weight of the birds at six to eight months old, if well fattened, is from twelve to fourteen pounds



YOUNG GOOSE CROSSES—EMBDEN AND TCOULOUSE.

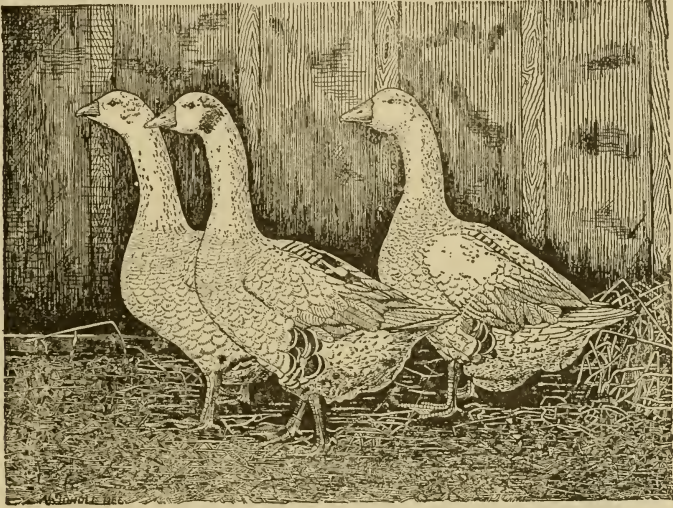
per pair, and sixteen pounds has been reached. For rearing entirely on land, we have not found them so good as the Rouen or Roan, but near lakes, ponds and streams there are no better or more profitable ducks.

VII. Muscovy Duck.

The Musk, or Brazilian duck was once regarded with great favor, and certainly they are both handsome and large, the drakes often weighing ten pounds. The color is a very dark, rich, blue-black, prismatic with every color of which blue is a component; there is a white bar on each wing, and more or less white about the head and neck. The feathers in the back of the drake are fine and plume-like; the legs and feet are dark. In warm climates they are said to be prolific, but our experience with them, years ago, was that they are neither hardy nor good layers. They are readily distinguished by the red membrane surrounding the eyes and covering the cheeks.

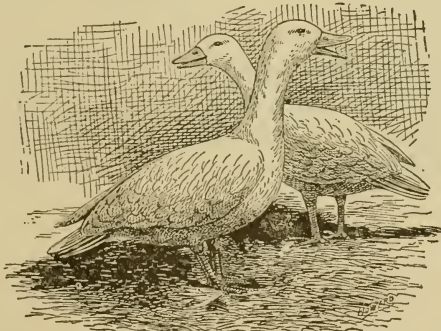
VIII. Black East Indian Ducks.

These are really black, and are among the most beautiful of ducks. From time to time they have appeared under various names, as East Indian, Labrador, Buenos Ayres, and Brazillian ducks. They are quite



YOUNG GOOSE CROSSES—EMBDEN AND AFRICAN.

hardy, and their color would suggest that they are closely related to the Mallards. Their beauty and hardiness, together with their small size will recommend them to amateurs; but for profit they cannot compare with the best of the large breeds.

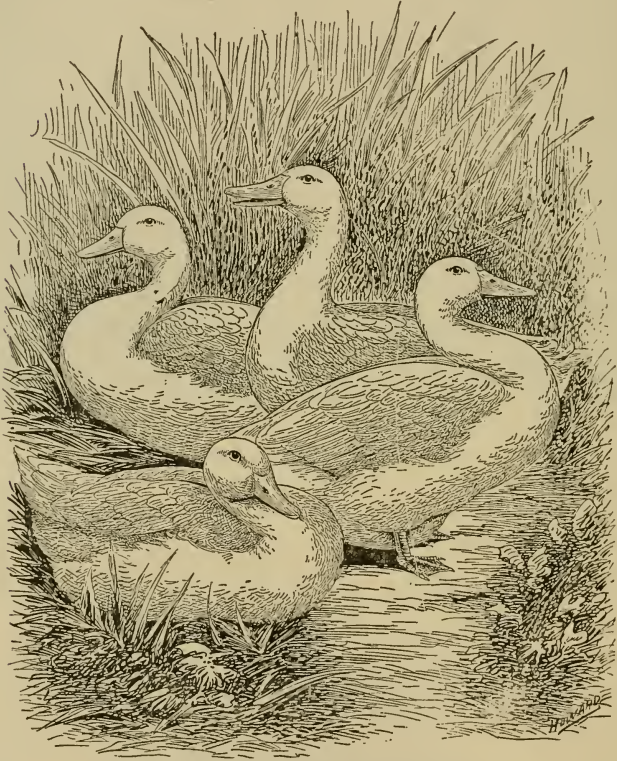


PAIR OF WHITE CALL DUCKS.

IX. Call Ducks.

There are two varieties of ducks which bear the same relation in size to the large breeds that Bantams do to other barn-yard fowls. These

are the Gray and the White Call duck. The Gray is the miniature counterpart of the Roan or Rouen duck, and the White resembles the Aylesbury except in size and color of the bill, which in the White Call duck is a clear yellow, while in the Aylesbury it is a flesh color. They



GROUP OF WHITE AYLESBURY DUCKS.

are pretty things on a lake or piece of water in ornamental grounds, and the colored variety is used by sportsmen as decoys for other ducks, they being noted for their loud, shrill, and oft repeated call; hence the name

X. Pekin Ducks.

These valuable waterfowls were originally introduced into the United States in 1873. Their weights come fully up to that of the Aylesbury duck, but they look larger, being exceedingly heavily feathered. The color is pure white, with a creamy tinge underneath. The flesh is not considered fully equal to the Aylesbury, but the feathers are superior. The beak of the bird is yellow; neck long; legs short and red. Pet Pekins are hardy, and can be made to weigh, at four months old, about twelve pounds the pair. The following are the qualifications and points required for exhibition birds by the American Association:

Head, long, finely formed; color of plumage, white; eyes, deep leaden-blue; bill of medium size, deep yellow and perfectly free from marks of any other color; neck rather long and large in the drake—in the duck, of medium length; color of plumage white, or creamy white breast and body. Breast, round and full; body, very long and deep, and in adult birds, approaching the outlines of a parallelogram; color of plumage, white or creamy white throughout; wings, short and carried compactly and smoothly against the sides; color of plumage, white; tail, rather erect, the curled feathers of the drake being hard and stiff; plumage, white; legs, thighs short and large; color of plumage, white; shanks, short and strong, and of a reddish orange color; plumage downy, and of a faint creamy white.

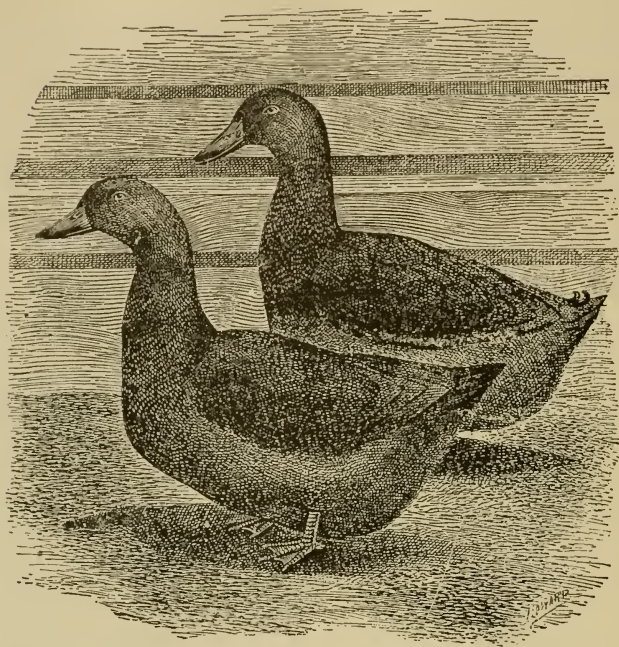
XI. Other and Rare Ducks.

Among the ducks of elegant plumage lately domesticated is the Wood duck, known all over the West, and now disseminated as the Carolina duck. It is one of the most beautiful of any of the varieties in the brilliancy of its plumage and varied elegance of the markings, one of the most striking in the graceful plume of feathers falling back from the head. They are so easily domesticated that they will allow themselves to be handled, if always treated with gentleness.

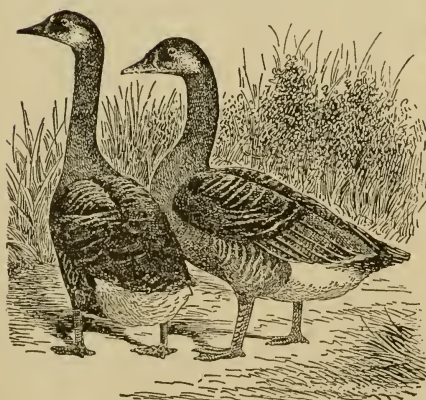
The Mandarin duck, a Chinese variety, is also a bird of splendid plumage, but rare.

Of the crested ducks, the White and the Black Poland are best known. Both are crested, the crest varying in size, but always bearing a ball of feathers, quite round.

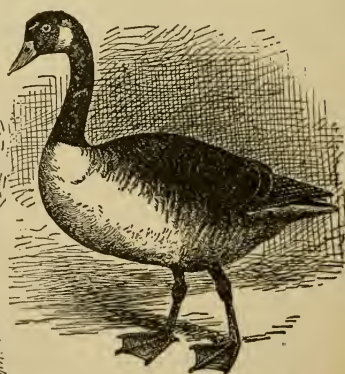
Another very rare duck, the Crested duck, said to be native to America, is described by Mr. Latham as being "the size of the wild duck," (an indefinite description), "but much larger, for it measures twenty-five inches in length; a tuft adorns its head; a straw yellow, mixed with rusty-colored spots is spread over the throat and front of the neck; the wings, speculum blue beneath, edged with white; the bill, wings and tail are black; irides red, and all the rest of the body ashy-gray."



PAIR OF BLACK CAYUGA DUCKS.



WILD AND AFRICAN CROSS.



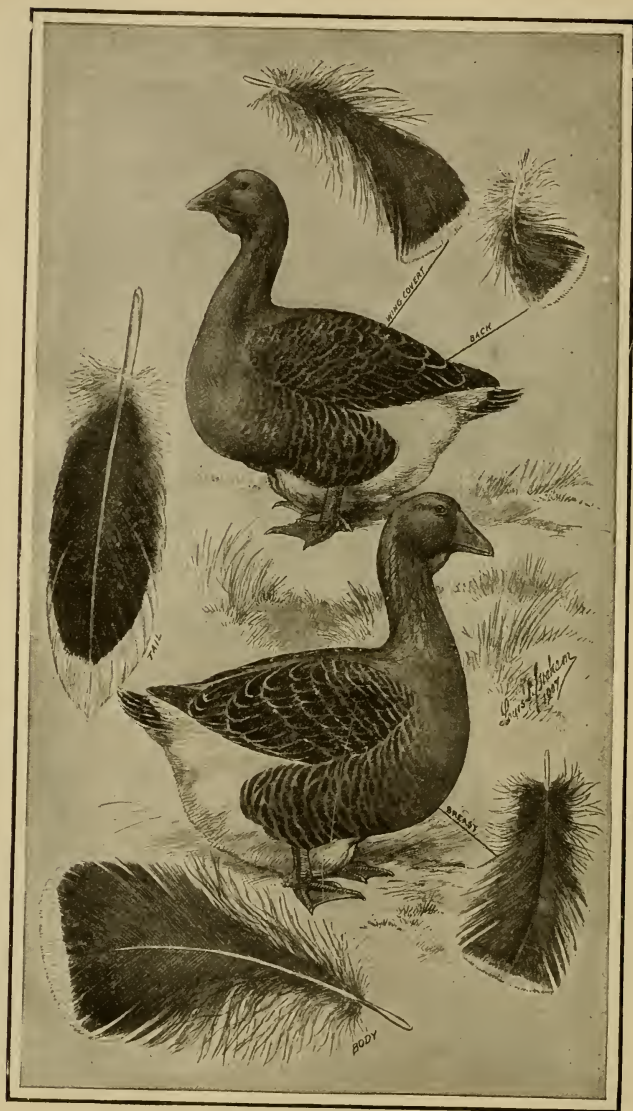
GRAY WILD GOOSE.

BOOK V

PART II

Diseases of Poultry

HOW TO KNOW THEM; THEIR CAUSES, PRE-
VENTION AND CURE



TOULOUSE GEESE AND FEATHERS.

From "Perfect Poultry of America," used by courtesy Hon. F. D. Coburn, Secretary, Kansas State Board of Agriculture.

DISEASES OF POULTRY.

CHAPTER I.

THE CARE AND TREATMENT OF SICK FOWLS.

I. DIVISION OF DISEASES INTO GROUPS.—II. APOPLEXY.—III. VERTIGO.—IV. PARALYSIS.—V. CROP-BOUND.—VI. DIARRHŒA.—VII. CATARRH.—VIII. BRONCHITIS.—IX. ROUP.—X. GAPES.—XI. PIP.—XII. CONSUMPTION. XIII. INFLAMMATION OF THE EGG PASSAGE.—XIV. LEG WEAKNESS.—XV. RHEUMATISM.—XVI. POULTRY LOUSINESS.—XVII. CHICKEN CHOLERA.

I. Division of Diseases into Groups.

The diseases to which poultry are subject, are comparatively few. Poultry lousiness; roup, a contagious disease; gapes; crop-bound; diarrhœa; catarrh; inflammation of the egg passage, and rheumatism, are the principal ones. These and a few others, only, will be noticed. They may be divided as follows: Diseases of the brain and nervous system; diseases of the digestive organs; diseases of the lungs and air passages; diseases of the egg organs; and diseases of the skin.

II. Apoplexy.

Causes.—The cause of this disease is usually overfeeding and confined quarters. The bird may be moping for some days, but usually the trouble is not noticed until the fowl falls, and dies with hardly a struggle.

What to do.—The remedy is to open the largest of the veins under the wing. By pressing on the vein between the opening and the body, the blood will continue to flow until the pressure is released.

Prevention —The prevention is plenty of exercise, and abstinence from over-stimulating food.

III. Vertigo.

This is caused usually by strong feeding and lack of exercise. The fowl runs in a circle with but partial control of the limbs, and sometimes falls and dies.

What to do.—When observed, hold the head of the bird under a stream of cold water which will soon give relief. Ten grains of jalap may be administered afterwards, and the bird be kept on a rather low diet.

IV. Paralysis.

This is also induced by the same causes as the two last mentioned diseases, and is the direct effect of some disorder on the spinal cord. But little can be done, when once a bird is thus attacked.

Prevention.—Plenty of exercise, a mixed diet, and well ventilated but dry quarters.

V. Crop-Bound.

Causes.—This is caused by irregular feeding. A hungry bird stuffs his crop to such a degree, that the whole, when moistened, becomes a dense impacted mass. Sometimes any large hard substance will serve as a nucleus for the gradual gathering of other substances around it.

What to do.—The treatment is to puncture the upper part of the crop, loosen the mass by degrees with a blunt instrument, and gradually remove the lump. If the incision is large, the slit may be sewed up, and the bird kept for ten days on soft food. If in good condition, the cheapest way is to kill the bird unless it be a valuable one.

VI. Diarrhœa.

The symptoms are obvious.

What to do.—The remedy is to give something to check the purging. Try the following:

No. 1.	5 Grains powdered chalk,
	5 Grains Turkey rhubarb,
	2 Grains Cayenne pepper.

If this does not check the discharge, give the following, until the bird is relieved:

No. 2.	1 Grain opium,
	1 Grain powdered ipecac.

Give every 5 hours, until relief is had.

VII. Catarrh.

Causes.—Damp quarters, and roosting in exposed situations.

How to Know.—In simple cold or catarrh there will be swelling of the eyelids, a watery or other discharge from the nostrils, and the face may be more or less swollen at the sides.

What to do.—Remove to comfortable quarters, and give warm food, liberally dusted with pepper. This will usually effect a cure.

VIII. Bronchitis.

Causes.—Bronchitis results when the effects of a cold expend themselves in the lungs and air passages.

How to know it.—There will be cough, a raising of the head to breathe, and a more or less offensive smell.

What to do.—In severe cases, give the following :

No. 3. 1 Grain calomel,
 $\frac{1}{8}$ Grain tartar emetic.

Strip a feather, also, to within one-half inch of the end, and swab the throat thoroughly with powdered borax ; also, let the fowls drink of the following :

No. 4. $\frac{1}{4}$ Ounce chloride of potassium,
 2 Quarts soft water.

This disease is sometimes called croup.

Preventives.—Good ventilation, cleanliness, and proper care.

IX. Roup.

When this disease is once found, the affected fowls should be either killed and burned, or else removed out of the way of the well ones. Or, better, remove the well ones to other quarters. Separation must be complete ; otherwise the entire flock will be subjected to the disease. It is one of the most fatal pertaining to fowls, and action should be decisive and promptly taken.

How to know it.—The symptoms, at first, are like those of severe catarrh ; but the discharge from the nostrils is thick, opaque, and of a peculiar and offensive odor. Froth appears at the inner corners of the eyes ; the lids swell, and often the eyes are entirely closed ; the sides of the face become much swollen, and the bird rapidly loses strength and dies.

What to do.—The fowls must have dry, warm quarters, and soft and stimulating food. Give, as soon as possible, for a small fowl, a teaspoonful, or for a large fowl, a tablespoonful of castor oil. The nostrils should be syringed, by inserting a small syringe in the slit of the roof of the mouth, with one part of chloride of soda to two parts of water. Three or four hours after the oil has been given, having divided the following into thirty doses, give one, two or three times a day :

No. 5. $\frac{1}{2}$ Ounce balsam copaiba,
 $\frac{1}{4}$ Ounce liquorice powder,
 $\frac{1}{2}$ Drachm piperine.

This is enough for thirty doses ; enclose each dose in a little gelatine, and administer as directed. If the fowls continue to get worse, kill at once and them.

X. Gapes.

This is caused by parasitic worms (*Sclerostoma syngamus*) in the wind-pipe, and occurs usually in chickens from two to four months of age. It has been said to be produced from a small, tick-like parasite, lodged on the heads of the chickens. If a case occurs, examine the chickens with a pocket lens, and if the parasites are found, destroy them with the following, which is good, also, for hen lice:



GAPE WORM.

2, natural size, 1, enlarged.

No. 6.

1 Ounce mercurial ointment,
1 Ounce lard oil,
 $\frac{1}{2}$ Ounce flowers of sulphur,
 $\frac{1}{2}$ Ounce crude petroleum.

Mix, by melting in a warm bath, and apply when just warm.

To cure the gapes, strip a small quill feather to within half an inch of the end; dip it in spirits of turpentine, and insert it into the opening to the wind-pipe at the base of the tongue; turn it around once or twice, and withdraw it. If relief is not had, repeat the operation again the next day. Give warm shelter, good, soft food, well mixed with a little black pepper, and skim-milk to drink.

XI. Pip.

This is not a disease but the result of another disease. It is the formation of a scale or crust at the tip of the tongue.

What to do.—Remove the incrustation, wash with chloride of soda, and if the nostrils are stopped, inject as advised for roup; if the fowl is very much ailing, give a teaspoonful of castor oil.

XII. Consumption.

This is a rare disease among fowls that are kept on the farm. It is a gradual wasting away, with cough and the throwing out of matter, and is the result of too close confinement in damp, unhealthy quarters. It often becomes hereditary in fowls so kept, and if you are unfortunate enough to have got such fowls from some breeder of pure-bred fowls, who was not attentive to his stock, kill them, since it is worse than useless to breed from them.

XIII. Inflammation of the Egg Passage.

How to know it.—The indications of this disease, rare in fowls kept on the farm, are as follows: If the inflammation is at the lower end of the passage, the egg is without shell; if the inflammation is in the middle

portion, the membrane is misshapen, or incomplete; if the whole passage is inflamed, the yolk is passed out without any covering.

The laying of soft shelled eggs is not evidence of inflammation. It may be the effects of being driven about, or of a want of lime material in the system to form the shell. In inflammation there will be fever, and the feathers, especially over the back, will be ruffled. The hen will be moping, and at times will strain to discharge the contents of the passage.

What to do.—The proper remedy is to give the following;

No. 7.

1 Grain calomel.

1-12 Grain tartar emetic.

To be given in a little gelatine.

Keep the hen afterwards, for some time, on nourishing but not stimulating food. As a rule the cheapest way, unless in the case of a valuable fowl, is, if the difficulty returns, to kill the fowl.

XIV. Leg Weakness.

This is a disease of young fowls and more generally of young males, rather than of pullets. The bird seems unable to support its weight, and constantly sinks down. The large Asiatic fowls are most subject to it. The remedy is nourishing diet, with a due proportion of insect or animal food. The grain should be cracked wheat, coarse oat-meal or barley meal, and if from three to eight grains of citrate of iron be daily given, it will greatly assist as a tonic.

XV. Rheumatism.

Causes.—This is a disease arising from cold, damp quarters, or those badly ventilated. Another cause is the chickens running in the dew or wet in the early season. Cramp is produced by the same causes. Little can be done, once they are affected.

Prevention.—The prevention is obvious. Good, clean, well ventilated quarters, and plenty of nutritious and varied food.

XVI. Poultry Lousiness.

There would seem to be little need for the appearance of this nuisance, if care were taken, and if new fowls introduced were first examined with a lens; for the parasites are very minute. The common hen louse, is larger than the "hen spider" so called, which is almost microscopic.

What to do.—The first may be destroyed by sprinkling the breeders and nests with Scotch snuff or flowers of sulphur, at intervals of two or three days.

The hen spider is more difficult to exterminate. When hens have been allowed to roost in a horse stable, we have known the horses and every

crevice to be so infested that only the most rigid means could exterminate them. This was by the application of flowers of sulphur, moistened with kerosene, applied to the roots of the manes and tails of the horses, and a thorough application to the fowls themselves. In addition, every part of the building must be thoroughly cleansed and washed, and every surface, crack and crevice filled with lime, slacked with ammoniacal liquor from the gas works; or in place of this use a little carbolic acid with ordinary lime wash. Wash, also, all the furniture, perches, nests, etc., with a solution of one pound of potash, to a quart of water, or the ammoniacal water of a gas factory. Then put in plenty of dust baths, and the difficulty will probably be ended.

XVII. Chicken Cholera.

First renovate the coops thoroughly; then saturate the roosts, floor and sides of the coop with kerosene oil. Then use Recipe No. 6 for lice. Grease your chickens thoroughly with it, *every one of them*, under the wings, and wherever the feathers are off. Repeat the greasing process in ten days, then once a month from the first of May until November, and use the following internally:

No. 8.	Hyposulphite of soda, 4 oz.,
	Water, 1 gallon.
	Mix.

Dissolve the soda in the water; then make cornmeal dough with the water, and feed it to your chickens twice a day for a week (just an ordinary feed), and then once a week through the summer months as a preventative. If, however, any are sick, give one teaspoonful of the water (without the meal) four times a day until out of danger. In the very great majority of cases, the above will be found effectual.

Bumble Foot in Poultry:—If the foot is swollen and contains matter, open it and press the puss out. Wash with warm water and apply tincture of iodine daily until cured. Burn off warty excrescences with lunar caustic or cut off with a sharp knife.

Feather Eating:—Feed chickens an all-around ration, give plenty of space for a run and you will have no trouble in this line.

Scaly Legs in Chickens:—"Wash legs in warm water, apply kerosene and anoint with lard."

Mites:—Treat the roosts, nests, etc., with either of the following, boiling hot: Salt brine or alum water.

Caponizing:—Instruments with directions for using them can be had by those especially interested.

CHAPTER II.

A SUMMARY OF DISEASES OF POULTRY AND THEIR REMEDIES.

I. DISEASES, BAD HABITS, AND INSECT PESTS.—II. IMPORTANCE OF CLEANLINESS
—III. DISEASES.—IV. BAD HABITS.—V. INSECT PESTS.

I. Diseases, Bad Habits, and Insect Pests.

It is not the purpose of this article to go into the details of the various diseases of poultry, but simply to consider briefly some of the common ailments and to give some of the simple remedies. Prevention is better than cure, so it will be well to consider some of the more frequent causes of diseases in general. Filth, dampness, improper ventilation, improper feeding, and the introduction of infected birds into the yard may be mentioned as some of the most common causes.

II. Importance of Cleanliness.

Everything about a poultry house should be kept reasonably clean. As a rule droppings should be removed daily, for the accumulation of excrement harbors parasites, contaminates the air, and breeds contagion. After the dropping boards have been cleaned, they should be sprinkled with road dust, coal ashes, land plaster, or air-slaked lime to absorb the liquid excrement. Nests in which straw or other similar material is used should be cleaned out and new straw put in about once every three or four weeks, or oftener if it becomes damp or dirty.

The quarters should be thoroughly whitewashed at least once a year, late in summer or early in the fall. The whitewash can be made by slaking lime in boiling water and then thinning to the proper consistency for applying. The addition of 4 ounces of carbolic acid to each gallon of whitewash will increase its disinfecting power. The runs should be plowed occasionally in order to bury the accumulated droppings and also to turn up fresh soil.

III. Diseases.

When a disease has become firmly established in a flock or a single bird is badly affected, the free use of the hatchet is usually the most practical method, as it does not pay to spend two dollars' worth of time in curing a one-dollar bird. Slight cases, however, can often be cured with but little trouble. In nearly every instance it is better to remove the well fowls and

put them by themselves, and in the case of infectious disease the premises should be thoroughly disinfected.

Apoplexy.—This is a disease of the brain caused by the rupture of one of the blood vessels. The bird is attacked suddenly and falls down, apparently dead or nearly so. The usual cause is too high feeding, but it may also be due to some other provocation, such as sudden fright, violent exertion, or straining in laying eggs. Fowls are sometimes found dead on the nest or under the perches. There is usually no previous warning, and so in most cases treatment is impossible, as the bird usually dies almost immediately. When, however, the sufferer is still alive pierce a vein on the underside of the wing and let it bleed freely. This will reduce the pressure on the brain and often result in a cure. The bird should then be kept on a limited diet for some time in order to reduce the surplus fat. As preventive measures, regulate the diet and give plenty of exercise.

Vertigo.—This is also a disease of the brain and may be regarded as a minor kind of apoplexy. The bird shows giddiness, throwing its head upward, backward, or to one side. The gait is uncertain and staggering, the sufferer often running around in a circle. Sometimes the bird falls to the ground, fluttering and making convulsive movements with the legs. The bird can often be revived by holding its head under a stream of cold water. After this keep the bird in a cool and shady place for some time and regulate the diet.

Bronchitis.—Bronchitis is a cold accompanied by a rattle in the throat or by a cough, and may be caused by exposure to dampness or cold temperature or by drafts of air. In the majority of cases the removal of the cause and good care will result in a cure. Inhalation of steam or vapor from boiling water has been found beneficial. Giving a teaspoonful of equal parts of cider vinegar and water has proven successful in some cases.

Catarrh.—Catarrh is a form of cold that is quite common among fowls, and may be caused by dampness, drafts of air, or exposure to cold. It is indicated by a watery discharge at the nostrils, which later becomes more viscid. Remove the cause, keep the birds fairly warm, and give them plenty of easily digested feed. The injection of kerosene into the nostrils is also beneficial. This may be done with a small syringe, a medicine dropper, or a small oil can. If catarrh has become confirmed, the nostrils and throat should be cleansed with hydrogen peroxide and equal parts of water several times daily, and the nostrils greased with vaseline.

Diphtheria.—The marked symptom is the appearance of a diseased growth in the throat and inside of the mouth, resembling raised patches of whitish or pale-yellowish skin, which may invade the entire throat and mouth, often also appearing like ulcers or sores on the face, comb, and about the eyes. Make a swab of cotton tied on the end of a stick and swab out the mouth with hydrogen peroxide. Remove any of the

growths that come away easily. This disease is very contagious, and any birds suffering from it should be removed from the flock and the premises disinfected.

Roup, or contagious catarrh.—The first symptoms of this disease are similar to those of simple catarrh, but as the disease advances there is often swelling of the sides of the head and the nostrils become closed with thick mucus, causing the bird to breathe through the mouth. If the swellings contain pus, they should be opened with a sharp instrument, the contents removed, and the wound treated with a mild antiseptic, such as a 2 per cent solution of carbolic acid. The application of kerosene mixed with an equal part of olive oil has given good results in many cases. When a fowl has a bad case of roup, it is usually better to kill it, unless especially valuable.

Pip.—This is a condition of the tongue caused by some such ailment as a cold, which compels the bird to breathe through the mouth. The continual passing of air over the tongue causes it to become dry, hard, and scaly, especially about the tip. The best remedy is to remove the cause, also wet the tongue two or three times a day with a mixture of glycerin and water, equal parts.

Bumble foot.—This is caused by bruises on the bottom of the foot, and is often due to the fowls having to fly from rather high perches and alighting on hard and uneven surfaces. Remove the cause by lowering the perches. If the foot is swollen and the swelling is filled with pus, it should be lanced and the pus permitted to escape. The wound should then be washed out with a 2 per cent carbolic-acid solution, greased with vaseline, and wrapped with a piece of cloth.

Cholera.—This is a contagious disease caused by bacteria, and is usually brought in by the introduction of infected birds or by water or feed contaminated by the excrement of sick birds. It is also possible for fowls to be infected through wounds or even by the inhalation of germs in the form of dust. The symptoms include great thirst and the voiding of feces of which the part normally white is yellow. This is not a sure indication of the disease, for the same thing may occur as the result of other disorders. Diarrhea is generally a prominent symptom, the droppings being thin and voided frequently, and in the later stages the yellow portion may change to green; the fowl becomes depressed, the feathers become ruffled, the comb becomes pale or very dark, and the bird has a poor appetite. Sometimes the disease runs rapidly through a flock, destroying the greater part of the birds in a week, or it may assume a more chronic form, extend slowly, and remain on the premises for several weeks or months. Fowls affected with this disease usually die within thirty-six hours. Most so-called cases of cholera are simply diarrhea.

In most cases medical treatment for cholera has proved unsatisfactory. The best method of combating this disease is to carry out strict sanitary

precautions as regards cleanliness and disinfection, and to totally destroy the carcasses of dead birds. Droppings should be burned or thoroughly disinfected by mixing with a 10 per cent solution of carbolic acid. Disinfect the building by spraying thoroughly with a 5 per cent solution of carbolic acid, and then whitewash.

Crop bound.—The crop sometimes becomes overloaded with feed, and its thin muscular walls become distended and partially paralyzed, so that the organ can not be emptied, or the opening into the lower esophagus may become clogged with a feather, a straw, or some other substance which the bird has swallowed. The crop is greatly distended and the mass of feed is rather hard and firm. In both cases the symptoms are the same and treatment should be conducted on the same principles. For treatment pour one-fourth to one-half ounce of melted lard or sweet oil down the throat and manipulate the contents of the crop with the hand in such a way as to tend to break up the mass. Unless the passage is closed the contents of the crop will usually pass away within a few hours. For a few days feed should be limited in quantity. If the foregoing method is ineffectual and an operation becomes necessary, clip away the feathers from a portion of the crop and with a very sharp knife, lancet, or razor make an incision about one and one-half inches long through the skin and the wall of the crop. Then carefully remove the contents of the crop with the finger, the handle of a spoon, or some other convenient object, and wash out the crop with warm water. Pass the finger, well oiled, into the esophagus to see there is no obstruction. Sew up the wall of the crop first and then the outer skin, using white silk or linen thread, being careful not to sew the two membranes together, and in a few days the wound will be healed. Feed sparingly on whole grains until the wound heals, and do not give any water for twenty-four hours.

Diarrhea.—This is caused by some irritation of the digestive system, and may be due to the quantity of the feed, the quality of the feed or drinking water, or to climatic conditions to which the fowl has been exposed. There is a general depression, roughness of plumage, and a loss of appetite, and usually frequent expulsion of soft, whitish, yellowish, or greenish excrement, the droppings become more liquid until severe diarrhea is present. When the affection is at all serious, the excrement may become mixed with mucus or blood. It is important that the cause be sought out and removed. See that the birds have comfortable quarters and that they are not exposed to drafts, cold or dampness. If taken early, diarrhea can often be checked by reducing the amount of green and animal feed and feeding largely on dry feed, eliminating the moist mash. Give a tablespoonful of sweet (olive) oil as a laxative to carry off any irritating matters that may be in the intestine. In severe cases give 5 to 10 drops of laudanum to each bird.

Gapes.—Gapes is caused by the presence of small worms, which are attached to the lining of the trachea or windpipe, where they cause much irritation and often death to young chickens. Gapes usually occur when the chicks are from 2 to 6 weeks old. Separate the well from the sick birds and clean the coops, pens, and feed and water dishes by disinfecting with a 5 per cent solution of carbolic acid. Sometimes the worms can be removed from the trachea by inserting a feather moistened with turpentine or kerosene. The oil will cause the dislodgment of the worms, and some will be drawn out with the feather, while others will be expelled by coughing or sneezing. Place the chicks on a piece of paper, so that the worms may be caught and burned.

Freezing (frostbite).—If the comb or wattles of fowls become frozen, and it is discovered before they thaw out, apply snow or cold water to remove the frost, for this gradual thawing will often save them. Then apply vaseline to the affected parts twice a day.

Scaly legs.—This is caused by a mite which burrows under the scales of the feet and shanks, and is considered to be infectious, but does not spread rapidly. It is noticed most frequently in old fowls. The scales can be removed by soaking the feet and shanks in warm, soapy water, and by rubbing or brushing them off with a toothbrush or nailbrush. After the scales have been removed apply sulphur ointment or equal parts of melted lard and kerosene. The frequent application of kerosene has also been found effectual without the previous soaking in water.

Chicken pox, or sore head.—This is a contagious disease caused by a fungus, and occurs in chickens, turkeys, pigeons, and sometimes in geese. It is quite prevalent and very destructive among young chicks in the Southern States. This disease appears as an eruption of yellow nodules about the beak, nostrils, eyes, and other parts of the head. These nodules reach their full development in five to ten days, when they emit a watery discharge, which later changes to a thick yellowish matter. As the disease progresses the birds grow thin and weak, and death results. In cases of spontaneous recovery, the nodules dry up and form crust, which later crumble away. The parasite causing it penetrates the skin of a healthy individual either through an abrasion, through punctures caused by bites of lice, etc., or less frequently through the normal skin. The disease is most prevalent during warm, damp weather, and consequently is most fatal to late-hatched chicks.

The following preventive measures should be employed: Keep affected birds from the premises; keep the houses clean and dry, and hatch the chicks early. Sick birds may be treated by applying carbolic ointment, or glycerin containing 2 per cent carbolic acid, to the affected parts twice a day. The sores may also be bathed with soap and water to loosen the crusts and subsequently sponged with a solution of copper sulphate (one-

half ounce to 1 quart of water). When other treatments are unavailing, tincture of iodine may be sparingly used.

Egg-bound.—Irritation of the oviduct, causing the membrane to become dry and deficient in its normal lubrication, an abnormally large egg, or a too fat condition of the hen may cause difficulty in expelling an egg from the body and produce the condition known as egg-bound. If the egg remains in the oviduct for a considerable length of time inflammation is produced, which finally develops into decomposition of the tissues and results in death. Fowls when egg-bound are restless, going frequently on the nest, showing a desire to lay and, in general, giving evidence of being in distress. Later they become dull and listless, remaining in this condition until death if not relieved. The egg can usually be felt in the posterior portion of the abdomen. If the trouble is early discovered, inject a small quantity of oil into the vent, and gently try to work the egg out. If this treatment is unsuccessful, hold the lower part of the body in warm water for half an hour, or until the parts are relaxed; then treat as above. It may be necessary to break the egg, allow the contents to escape, and remove the shell in pieces. After removal of the egg give soft cooling feed.

Occasionally difficulty in laying an egg causes prolapsus or eversion of the oviduct. When this occurs the oviduct is partially turned inside out and protrudes from the vent. If the egg causing the trouble has not been expelled, remove it, wash the exposed portion of the oviduct with warm water, apply carbolated vaseline or lard, and return to its normal position by gentle pressure. In addition it is well to give the fowl 3 to 5 drops of fluid extract of ergot.

Intestinal worms.—Worms are frequently present in the intestines and ceca of chickens, particularly young chicks, often causing considerable loss. Practically the only way to determine that worms are present is to examine the ceca and intestines of dead chicks. The worms are small and hairlike. Occasionally flat tape worms are found, but these are not very common. Chicks infested with worms go off feed and become thin and sickly looking.

In combating worms care should be taken to keep clean the soil over which the chicks run, and to move the runs each year or two if possible. Cleanliness in the house must also be observed. In treating affected birds, powdered areca nut (20 to 40 grains per fowl), administered either in mash or mixed with butter and made into pills, is an effective remedy. Powdered male fern (30 grains to 1 dram), or oil of turpentine (1 to 3 teaspoonfuls), alone or diluted with an equal bulk of olive oil, is also very good. It is well to follow any of these remedies with a dose of castor oil (1 to 3 teaspoonfuls).

Limber Neck.—This disease, as its name indicates, is characterized by the limp condition of the neck, the fowl practically losing all control of

the neck muscles, so that the head rests on the ground. This condition occurs in warm weather, and is caused by the fowls eating decomposed flesh in which a ptomaine has developed. This poison causes partial paralysis of the neck muscles and often results in the death of the birds. Maggots eaten by fowls do not cause the disease, except as they may contain the poison which they have obtained from the decaying flesh.

The best and most effective treatment is, of course, never to leave any dead fowls or other dead animals around, but to bury or burn all carcasses. Treatment of sick birds is not usually very successful, but a teaspoonful of castor oil is sometimes effective.

IV. Bad Habits.

Egg eating.—This habit sometimes becomes a serious vice, fowls becoming very fond of eggs when they have learned to eat them, and it often spreads from fowl to fowl. It usually begins through accident by eggs being broken or frozen. Be careful to see that this does not happen. See that the nests are properly supplied with straw or other nesting material and have them darkened, so that if an egg is accidentally broken the fowls will not be likely to discover it. Supply plenty of lime in the form of oyster shells, bone, or similar substances to insure a firm shell. As soon as it is discovered that a fowl has formed the habit, the fowl should be removed, in order to prevent the spread of the vice. Once formed, it is difficult to eradicate, and the safest remedy is the death penalty.

Feather eating.—Fowls sometimes pluck feathers from themselves and from each other, which is often caused by too close confinement, by the presence of insect pests, or by improper feeding. When some of the fowls of a flock have formed the habit slightly, a wide range with a change of diet, including a plentiful supply of animal feed, and freedom from insect pests, will usually correct the evil. Above all, see that the fowls have plenty of inducement to exercise. If the habit becomes well formed it is very troublesome and may necessitate the killing of some of the fowls in order to stop it.

V. Insect Pests.

Two classes of external parasites, popularly known as lice and mites, will be considered here. There are several varieties of lice which attack poultry. They subsist mainly on the feathers and perhaps on the epidermic scales. They are found largely on the head and neck, under the wings and about the vent, and when present in large numbers they cause the fowls much discomfort. Persian insect powder (pyrethrum), powdered sulphur, and some of the various preparations on the market, such as the louse powders, are good in combating these pests. The hens can be dusted with one of these powders after they have gone to roost. Have the

powder in a box with a perforated cover, grasp the fowl by the legs, and shake the powder well among the feathers. Dust at least three times at intervals of about a week in order to catch the lice which hatch out after the first dusting.

The mites subsist on the blood of the fowls and are not usually found on the bodies of the bird except when at roost or on the nest. During the day they inhabit cracks and crevices of the walls, roosts, and nests. Sitting hens are often so annoyed that they are compelled to leave the nests in order to relieve themselves of these parasites. The free use of kerosene about the nests and perches is useful in fighting mites. The walls of the house may be sprayed with kerosene, the operation being repeated every three or four days for two weeks. Insect powders are of little avail.

The following method has proved excellent in ridding houses of mites and lice when the weather conditions are such as to permit the birds being kept outside the house for five or six hours. Close all the doors and windows and see that there are no cracks or any other openings to admit air. Get an iron vessel and set it on gravel or sand near the center of the house; place in the vessel a handful of shavings or straw saturated with kerosene, and on these sprinkle sulphur at the rate of about 1 pound to every 90 or 100 square feet of floor space. Instead of using the shavings and kerosene the sulphur can be saturated with wood alcohol. When everything else is in readiness light the material and hastily leave the house. In case any anxiety is felt about fire, a glance through a window will show whether everything is all right. There is very little danger of fire when proper precautions have been taken to have plenty of soil beneath the vessel. Allow the house to remain closed for three or four hours, at the end of which time one can safely conclude that there are no living beings inside. Now throw all the doors and windows wide open so as to drive out the sulphur fumes thoroughly, and then the fowls may be allowed to enter. Let them in one by one, and as each enters catch it and dust it well with insect powder, which will destroy the lice on the birds. Tobacco dust is also good to use instead of insect powder. The birds and house have now been freed from vermin for the present, but the eggs of the insects have not been destroyed, and in a week another swarm will be hatched out. Therefore it will be necessary to repeat the operation once or twice before the pests are exterminated. After this care should be used to see that no strange fowl is admitted to the house or yard without having been thoroughly rid of lice, for one lousy hen will contaminate all the rest.

CHAPTER III.

DISEASES OF THE TURKEY. CAUSES, PREVENTION AND CURE.

I. PARASITES AND DISEASES.—II. INSECT PARASITES.—III. GAPES.—IV. BLACK-
HEAD.—V. TAPEWORM.—VI. DIARRHEA.—VII. CHOLERA.

I. Parasites and Diseases.

No kind of young poultry is so susceptible to the effects of unfavorable conditions as young turkeys. They must be carefully protected from attacks of parasites and from excessive heat and dampness until they have gained sufficient strength and size to wander away with the parent turkeys and care for themselves upon the range.

II. Insect Parasites.

The chief danger from lice and mite attacks to the poults is directly after the poults are hatched; but the best remedy is to deal with the hen before the young are hatched. The plumage of the hen should be dusted with insect powder close down to the skin from head to hock joint, being careful not to get it into the eyes. This should be done at least twice a week until within two or three days before hatching. The most careful attention should be given to this. Never use lime or sulphur for this purpose. Nothing is better than Persian insect powder, but any good insect powder will answer the purpose if it does not contain ingredients that are injurious to the eyes.

It may often occur, however, that the hen will not have been properly treated, and so lice and mites will be found on the young; and, in order that the poults may live and thrive, they must be freed of these enemies. As soon as the young are ready to leave the nest they must be examined carefully for lice, which may be on top of the head, under the throat, or about the wings or vent. Some of them are gray in color and difficult to see. They may be destroyed by the use of sweet oil, rubbing a very small amount upon the head and throat; insect powder is sufficient for the other parts of the body. It is very important that only a small amount of the sweet oil be used, as too much is injurious. Kerosene should never be used to destroy parasites.

III. Gapes.

After external parasites, the most destructive ailment of young turkeys is the gapes.

Cause of the trouble.—This comes from certain small worms that are picked up by the young turkeys in places that have become infested with them. Some believe that the angleworm is the cause of the spreading of gapes, and it probably is one of the causes. It is possible for the angleworm or other worms to be infested by gapeworms, and thus, when eaten, to cause the gapes in young chickens and turkeys. Whenever the ground is infested with the gapeworm eggs they may readily infest all the angleworms in the same soil, and the eating of these may cause the infestation of the young poults.

Treatment.—Many remedies are recommended for this ailment, few of which have ever proven of much advantage. A feather or a twisted horse hair may be introduced into the windpipe for the removal of the gapeworms. Some recommend the feeding of finely chopped garlic and of turpentine in the mash, while others suggest the mixing of a teaspoonful of naphtha or benzine in enough mixed food for a dozen poults. The theory of the use of these remedies is that the fumes from the turpentine or the benzine will pass through the entire body and into the windpipe and destroy the gapeworm.

These remedies are known to have destroyed as well as to have cured, and great precaution must be observed in their administration; try them on a few at a time and do not risk the destruction of the whole flock. Another remedy is to place the ailing chicks in a box over which has been stretched some cheese cloth; take some very dry air-slaked lime and sift it down onto the poults or chicks through the cheese cloth; this fine dust will penetrate the nostrils and throat and cause a violent coughing and sneezing, which tends to dislodge the gapeworms and give relief. It is, however, a dangerous remedy which should be cautiously used rather as an experiment than as an absolute cure.

Prevention.—No saying could be more truly applied to this ailment than "a pound of prevention is worth a ton of cure," and cleanliness is the only sure preventive of gapes. Where the ground has become infested, a very thin coating of slake lime should be scattered all over it early in the spring before the frost is out of the ground and allowed to lie there until the frost disappears, leaving the ground almost dry; then take a hoe and scrape off all the lime and one-half inch of the soil, cart it away, and bury it at least four feet under ground.

Another plan is to sprinkle the soil with water into which has been mixed some sulphuric acid; after twenty-four hours cover the surface with lime and turn the soil under with a plow. A surer and better way than this is to remove your poultry plant to an entirely new part of the farm where there is no danger of infestation, then spread a coating of lime over the infested land and plow it under and cultivate it for a year or two.

Examinations made by opening the windpipes of dressed turkeys during the winter have frequently revealed the presence of two, three, or four

gapeworms attached to the lining membrane of the windpipe; thus is shown the possibility of carrying the infection over in grown birds, which must likewise be provided against. The grown turkey might be carefully subjected to the lime-dust treatment as above, to produce coughing or sneezing, and some of the mucus may be taken from the throat with a fine platinum loop and examined under the microscope for worm eggs. Those showing evidence of the presence of the worms should be kept isolated and treated until they are known to be free of the worms.

IV. Blackhead.

In many localities turkey growing has become almost extinct as the result of the scourge known as blackhead. This disease was first noticed in New England, but quickly spread throughout the entire country.

Nature of the disease.—It first attacks the cecum—the blind gut situated between the large and small intestines. It also attacks the liver, this organ becoming very much enlarged, often to twice its normal size, and showing over its surface discolored spots varying from one-eighth to two-thirds of an inch in diameter, shading in color from whitish lemon to dark yellow.

While this disease is attributed to microbes, it is thought to be very much aggravated or increased through inbreeding. In other words, many attribute the prevalence of what is known as blackhead to the depleted vitality of the stock of breeding turkeys, making it possible for the germs to grow and gain destructive foothold.

Symptoms.—Diarrhea is the most marked and constant symptom, and may be expected sooner or later in the course of the disease; it results from inflammation and internal weakness. A peculiar discoloration of the head occurs when the disease is at its height, which has led to the popular designation of blackhead. This disease attacks very young turkeys and often lasts for several months before causing death. The fact that the propagation of this affection is more active during midsummer has led to the belief that it is exclusively a summer disease.

Treatment.—The use of medicine has not proven very successful. Among the remedies most recommended are sulphur, sulphate of iron, quinine, and salicylic acid. Sulphur may be given, 5 to 10 grains being combined with 1 grain of sulphate of iron; or sulphur, 10 grains, sulphate of iron, 1 grain, and sulphate of quinine, 1 grain. It is necessary that such treatment be repeated two or three times a day and continued for considerable time to obtain results.

Some people who have had experience with this ailment in recent years believe that it results largely from inbreeding, the infection being transmitted from one flock to another by affected birds or eggs. The remedies applied proving of little benefit, the only alternative is the introduction of new, strong, and healthy stock. Some have gone so far as to

destroy their entire flocks, and, after having thoroughly disinfected the premises, started with new, healthy stock, while others have introduced wild blood into their flocks.

In all bowel troubles in turkeys, feeding boiled rice has proven of benefit, and it has been largely practiced by experienced growers. Many feed the boiled rice to the young poults to prevent the coming of the destructive diarrhea. The most successful way to obviate a dangerous looseness of the bowels is to avoid feeding wet or sloppy food and guard the young from taking cold. The feeding of small particles of charcoal is beneficial to the young from the fact that it sweetens the crop and gizzard and prevents fermentation, which is very injurious and destructive. Above all things, never make use of infected turkeys for breeding stock.

V. Tapeworm.

Tapeworm and worms of all kinds are very injurious to turkeys.

Symptoms.—The presence of the tapeworm may be recognized through the indolent, drowsy spirits of those infested with it; a careful examination of the voidings will also reveal its presence, as those infested will pass small portions of the worm.

Treatment.—Powdered male fern is an effective remedy, and may be administered in doses of from 30 grains to 1 dram of the powder; or of the liquid extract, 15 to 30 drops. This should be administered morning and evening before feeding, the minimum dose to the younger, increasing the dose as they grow older. Oil of turpentine is an excellent remedy against worms of all kinds which inhabit the digestive organs of poultry. A common remedy made use of by some for the removal of worms from fowls is one drop of kerosene oil night and morning. This should not be administered to the very young, but may be used with impunity after they are a few weeks old.

VI. Diarrhea.

Looseness of the bowels or diarrhea is quite too often mistaken for cholera; but such looseness may come from any of the several causes, such as bad feeding, dampness, filth, or infestation with lice. The removal of the cause is the very best cure. Feeding boiled rice and a little charcoal, as already stated, will prove of great benefit. The remedy most often used is a mixture of equal parts of ground ginger, cinnamon, cloves, and cayenne pepper. This is mixed into the mash food, about a stroked teaspoonful to a dozen very young poults. Double the amount after they are four or five weeks old. What is known as Sun cholera mixture is very beneficial, either when mixed in the drinking water or the mash food. This may be given so that each would have from 5 to 20 drops at a time, according to age.

VII. Cholera.

Cholera, when present in its true form, is a most uncompromising disease. The only thing that can be done to save a flock of turkeys attacked with true cholera is to remove all the ailing ones immediately and destroy them. Transfer those not attacked to some other part of the farm and thoroughly disinfect and clean up the locality where they have been, feeding nothing but a slight grain diet for a short time. Medical treatment has been of very little service in this ailment. The drugs that have been used are sulphur, copperas, capsicum, alcohol, and resin, either administered separately, or equal parts thoroughly mixed together and administered in the mash food.

Diarrhea and blackhead are often mistaken for cholera. If it is always remembered that the carcass, no matter from what cause the fowl may have died, should be either burned up or buried at least 4 feet underground, no infection to other fowls is likely to result. No other known cause of the spreading of the disease equals the permitting of dead bodies of infected fowls to lie about.

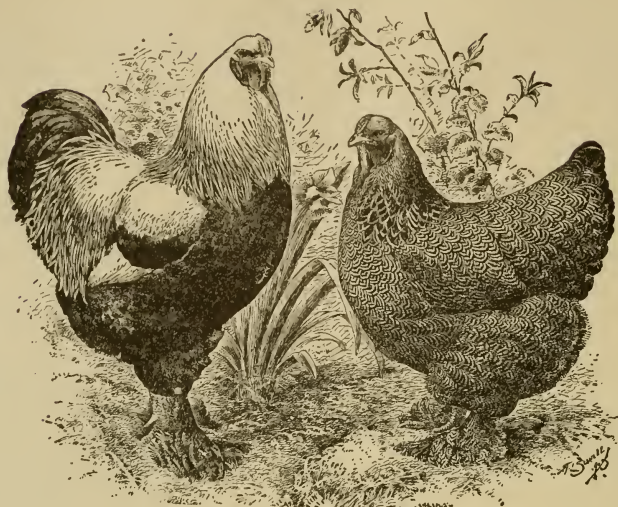
Turkeys, like poultry of all other kinds, are subject to the other diseases and ailments which affect fowls, most of which may be prevented or avoided if proper care and attention are given to the sanitary conditions and to the proper feeding of the stock.



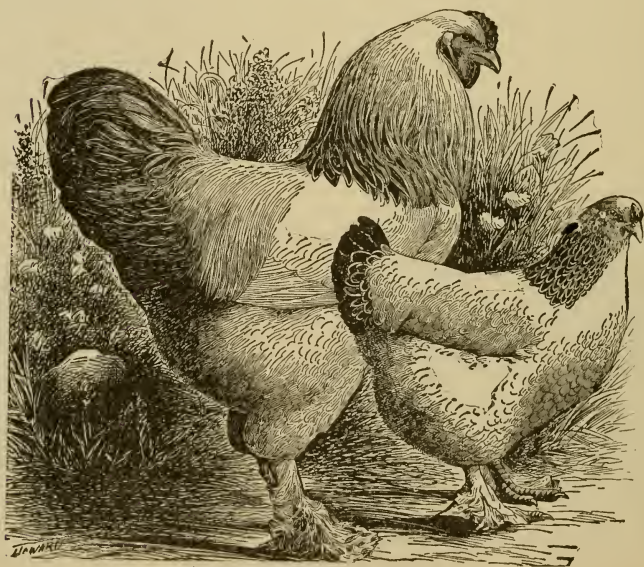
HEAD OF BARRED PLYMOUTH ROCK, MALE.



HEAD OF BARRED PLYMOUTH ROCK, FEMALE.



A PAIR OF DARK BRAHMAS.



A PAIR OF LIGHT BRAHMAS.

BOOK VI

BEES

HISTORY AND CHARACTERISTICS,
WITH DIRECTIONS FOR THEIR
SUCCESSFUL MANAGEMENT



THE GENDERS OF BEES. BEE-KEEPER AND SWARM.

B E E S.

CHAPTER I.

VARIETIES AND PECULIARITIES OF BEES.

- I. NATURAL HISTORY OF BEES.—II. THE THREE GENDERS OF THE HONEY BEE.—III. VARIETIES OF THE HONEY BEE.—IV. THE SO-CALLED QUEEN OR MOTHER BEE.—V. THE NUMBER OF EGGS LAID.—VI. DRONES OR MALE BEES.—VII. NEUTER OR WORKER BEES.—VIII. VARIETIES OF HONEY.—IX. WAX AND HOW IT IS FORMED.—X. PLANTS ADAPTED TO THE PRODUCTION OF HONEY.

I. Natural History of Bees.

In all times, and among all nations and tribes, however savage, the honey bee has been held in high esteem. Among savages and barbarians bees have always been prized for the stores of sweets they produce, and among more civilized people, for the interest attached to the study of their peculiarities and habits, as well as for the value of the honey as an article of food or luxury.

The honey bee belongs to the order *Hexapods*, that is true insects: and to the sub-order *Hymenoptera*. This sub-order includes wasps, ants, sand-flies and ichneumon flies. The group comprises insects having a tongue for taking liquid food, as well as strong jaws for gnawing and biting. The family to which the honey bee belongs (*Apide*), includes all insects which feed their young or larvæ on pollen and honey.

Insects of this family have broad heads; also antennæ or feelers, usually thirteen-jointed in the male, and only twelve-jointed in the female; the jaws (*mandibles*) very strong, often toothed; the tongue (*ligula*) long; the second jaws (*maxilla*) one on each side of the tongue, also long; and the tongue, when not in use, generally folded back once or twice under the head. The *larvæ* are footless, maggot-like grubs, which are fed on honey and pollen; and a peculiarity of the honey bee is, that the neuter egg may be changed during its growth, by the workers, when necessary, so that the fertile or mother form (queen) is produced.

The mother bee is impregnated but once, and lives several years laying eggs, producing neuter bees or males, apparently at will, though probably according to a natural law not yet fully understood. The worker bees live not over one year, and the males are destroyed at the end of the first

summer's growth. This much must suffice, since the object is not to write a dissertation on the natural history of the honey bee, but simply to give such information as will assist the practical farmer in keeping such a number of swarms as his range will support, without seriously interfering with the ordinary labor of the farm.

There is a poetry lingering about the subject of bees and bee-keeping, that probably will never be eradicated from the human mind, a feeling that has come down from the earliest antiquity, and fostered from generation to generation, among all peoples, especially so until the production of other sweet substances became possible to man. Another reason, and perhaps the key note to the poetry of the subject, is the curious as well as perfect economy of this interesting species, in all its details.

II. The Three Genders of the Honey Bee.

We find these interesting insects living in colonies of many thousands, apparently under an intelligent system of government, composed of three distinct classes. These are the female, or mother bee, the neuters, or workers, and the males. The single female in a swarm has, for her sole province, to lay the eggs from which the young are hatched; the males



QUEEN BEE.



DRONE.



WORKER.

or drones have no other duty save that of impregnating the single female once, thus rendering her fertile for life; the worker bees, whose gender is neuter, gather all the food, prepare the wax, build the cells, store the honey, feed the young larvæ bees, clean the hive, and perform all the labor. These three classes of bees are represented by the cuts; the outlines are all enlarged, but retain the relative proportions each to the others. Thus, the young bee-keeper may readily distinguish each variety of bee at sight. For the want of such object lessons we have known old men who had, as farmers, kept bees all their lives, unable to distinguish one from the other, and, in fact, who had never seen the mother bee at all

III. Varieties of the Honey Bee.

Our domestic bee belongs to the *Apis Mellifica*, and is a native of the Eastern Hemisphere, none having been known in the western half of the globe, until brought here from beyond the Atlantic; but once introduced, they have taken kindly to our climate, and are now spread over the whole of North America where the winters are not too severe, since their natural instinct of swarming enables them easily to escape from domestication. The varieties of the honey bee best known are the Black, or German bee, and the Italian, or Ligurian bee, both of which varieties were known as long ago as the time of Aristotle, 400 years before Christ. The so-called Black bees are not really black, but a gray-black. The specific distinction between the two varieties above mentioned was first made by Spinola, in 1805, who called one the German, and the other the Ligurian, the name Italian being a synonym, adopted lately for the reason that the first well-known importation of them to the United States was from Italy. In 1859, these "Italians" were imported simultaneously into England and the United States from Germany, and the next year an importation was made direct to the United States from Italy, where they were systematically kept; and now they are generally disseminated throughout the United States and Canada.

The German bees are pretty much self-colored. The Italians are easily distinguished by the bright yellow rings—three in number when the breed is pure—at the base of the abdomen.

The Egyptian bees (*fasciata* or banded) are broadly banded with yellow. They are smaller, more slender and yellower than the Italians, and are supposed to be the bees mentioned in scripture. Vogel states that they gather no propolis; they are also reported to be active, to stand the cold well, and to be cross and more liable to sting than either the German or Italian. Italian bees are credited with being the best natured of any, a matter not difficult to account for under the laws of heredity, since they are the oldest of thoroughly domesticated bees.

Another variety of bees that has received attention is the Cyprian bee, which is yellow, and undoubtedly a variety of the Italian. A variety of Italians has recently been sold, called Albinos, from their white hairs; the probability is that all Italian bees have these white-haired individuals naturally among them. The Carnolian, the Heath, the Herzegovinian, and the Krainer bees are also described by fanciers. In these days of sharp practice there are yearly candidates for the farmer's money on every hand. Our advice is that farmers stick to the German and Italian; they are good enough for every day use.

IV. The So-Called Queen or Mother Bee.

The mother bee has no sovereign attributes, though the ancients called her the King, and hence our name Queen, adopted since her true gender became known. She is simply a perfectly developed female with ovaries occupying nearly the whole of her abdomen, which, as shown in the cut, is of great length; and the spermatheca, capable of being compressed at will, is capable, according to Lenckart, of containing 25,000,000 spermatozoa. Hence, the mother bee may lay fertile or infertile eggs at pleasure. She is longer than either the drones or workers; her wings are shorter; and although armed with a powerful sting, she seldom uses it. It has been a mooted question, whether it be possible for the mother bee to be impregnated except while on the wing; the probability is that she can only be thus rendered fertile, the male losing his life with the accomplishment of the act.

V. The Number of Eggs Laid.

The energy with which the mother bee lays eggs is startling. It is her sole province to keep the colony populous, and since the life of the worker is short, her activity must be fully employed, during mild weather. She is capable of laying from 2,000 to 3,000 eggs a day when necessary, and has been known to lay six eggs in one minute. That most careful observer, Berlepsch, says he had a queen that laid 3,021 eggs in twenty-four hours, by actual count, and 57,000 eggs in twenty days; that this queen continued prolific for five years, and must have laid more than 1,300,000 eggs at a low average during this time. Other careful observers, notably Dzierzon, say queens may lay over 1,000,000 eggs.

VI. Drones or Male Bees.

The drones are the male bees, and their presence or absence often seems to be determined by the necessities of the colony. It is probable that, if allowed, the drones would live as long as the worker bees; but from May to November is the time when they are usually found in the hives. The usual number in a hive is from two hundred to three hundred, but less than half this number may safely be left by the bee keeper to ensure the impregnation of the young queens at swarming time. The worker bees kill all remaining drones in the autumn, usually before hard frosts occur. An unimpregnated queen will lay eggs producing drones only, but after fertilization can lay either worker eggs or those producing male bees, apparently at will.

VII. Neuter or Worker Bees.

The worker bees are undeveloped females, that is with abortive ovaries; sometimes, though rarely, they become so far developed as to lay drone

eggs. How this happens is not certainly known, but the probability is that they may have been partially fed with the food used in producing queens. This is the opinion of Burlepsch, and Langstroth, but the opinion of Huber is, that, reared near royal cells, they received the same food accidentally. They do not differ from the ordinary worker except in the power of laying eggs as stated. The number of workers in a hive will range from 1,500 to 4,000, and even more; about 3,500 should be contained in every strong colony of bees.

The worker bees are peculiarly constituted for the work; the tongue, labial *palpi* and jaws are long, and the tongue hairy, enabling them easily to lap up their liquid food. When filled, the tongue is doubled back, and disengaged of its load by the inclosing *palpi* and jaws, and the load is sucked into the honey bag. The bees have, also, the power of injecting the contents of the honey bag for feeding bees, or for filling the honey cells. The jaws are strong, with semi-conical cutting edges, so they may cut comb, knead wax, and perform the other work intended by nature. Their eyes are like those of the queen, but the wings are longer and, like those of the drones, reach the end of the body when at rest. The three cuts on page 1228 will show the differences perfectly.

On the outside of the posterior limbs next the body, is a rim of hairs, forming what is called the pollen basket. The pollen is gathered by the organs of the mouth, and carried back by the four anterior legs. On the anterior legs is a notch covered by a spur; its use is not well known. The sting of the worker is strong, sharp and straight, unlike that of the queen, which is curved. The gland which secretes the poison is double, and the poison sack is the size of a flax seed. The sting is triple, and armed with barbs. Hence the sting is not easily withdrawn when once fully inserted, and hence the bee so stinging loses its life, since the sting and a portion of the alimentary canal are left in any tenacious substance it may penetrate, as the skin of the hand for instance.

VIII. Varieties of Honey.

Natural honey is the fluid nectar of flowers. It undergoes slight modifications in the honey bag of the bees, and is somewhat changed chemically, but retains the flavor, and to a certain extent, the aroma of the flowers from which it is gathered. Hence, certain districts noted for special plants, and aromatic flowers, produce highly prized honey, while other districts produce unwholesome honey from the noxious or poisonous flowers. Thus in ancient times, the honey gathered in the district of Mount Ida was famous for its excellence, while that of Trebizond was abhorred.

Honey contains grape sugar, manna, gum, mucilage, extractive matter, the odor of the flowers from which it was taken, and a little wax, pollen

and acid. In fact, it is said that under the microscope, the pollen contained has determined some of the flowers from which the honey was taken. When first drawn from the comb the honey is quite fluid, but in time candies, as it is termed, that is, the solid glucose separates from the fluid parts, and is identical, chemically, with grape sugar; nevertheless the solid and fluid parts are not essentially different. All honey tends to crystalize with age, and become yellow.

The adulterations of honey are various. That from glucose ("corn sugar") is the most difficult of detection; starch, chalk and other solids, may be detected by heating the honey, whereupon these impurities will settle to the bottom. Of late years the filling of old comb with glucose has been so largely practiced, that it is not safe to buy any but white comb, capped over. Hence pure comb, capped by the bees, commands two or three times the price of strained honey.

IX. Wax and How It is Formed.

The wax used by bees in the formation of the cells is a solid, unctuous substance, secreted by the bees in pellets of an irregular pentagon shape, on the under side of the abdomen; it is in very thin scales, secreted by and moulded upon the membrane towards the body from the wax-pockets. There are four wax-pockets on a side, and thus eight scales may be secreted at a time.

Wax is a costly product for the bees, the production of one ounce of wax requiring the consumption of about twenty ounces of honey. Hence, modern ingenuity has invented a machine for pressing out thin scales of wax of the true hexagonal shape, although the natural combs are not true hexagons. The formation of the comb by bees is one of the most interesting and wonderful things in nature. The walls of a new cell are only 1-180th of an inch in thickness, and so formed as to combine the greatest possible strength with the least material, and the least cost of space. The drone cells are about one-fifth larger than those of the workers, the diameter of the worker cells averaging little more than one-fifth of an inch, while drone cells are a little more than one-fourth of an inch, or, according to Reamur, respectively two and three-fifths lines, and three and one-third lines.

Comb, when first formed, is always transparent; when dark, it has become so from being used as brood comb, the color being due to the cocoons left in the cells. When used solely for honey, they are often drawn out even to an inch in length. The capping of the brood-cells is dark, porous, and convex, while the capping of those in which honey is stored, is white and concave.

X. Plants Adapted to the Production of Honey.

Aside from artificial feeding, the practice of which will hardly be adopted and cannot be advised among farmers, or those who do not make bee-keeping a special business, the prevalence of honey-bearing plants must be specially considered, in deciding upon the number of hives which may be profitably kept. It is generally supposed that garden flowers are a prolific source from which bees get their stores; such, however, is not the case. In the West those annuals or perennials prolific in honey are, many of them, spicuous, and of great value aside from this use. Of the clovers, the Alsike, the White, and the Sweet clover are eminent for their bee-feeding qualities. The last named is of no value except as bee pasturage.

Bee-keepers have been accused of purposely sowing this fragrant weed for this purpose, much to the annoyance of farmers, and it cannot be denied that it has become largely prevalent where bee-keeping is established as a distinct industry. These plants bloom in June and July, while red clover is not available as bee food until the second growth is in blossom, after harvesting the first crop for hay. The earliest bloom will come from dandelion, the strawberry, and other wild and cultivated plants, and the observing bee-keeper must be governed by the prevalence of bloom, in estimating how many swarms may find forage during April and May—a most trying time for bees. In May and June the sumac and the white sage are valuable in California, while in the South the cotton plant is a prolific source of honey from June until frost; and during this time, in various parts of the country, mustard, rape, the milk weeds, and St. John's wort, yield abundant stores of honey. In July, corn is the great honey-producing plant all over the West; in August, and thence until frost, buckwheat is the great honey producer; and during the later season, the vast array of wild flowers will be available, among them asters, golden-rod, the wild sunflowers, beggar-ticks, Spanish needles, tick seed, etc.

In all forest regions the bees feed upon the bloom of shrubs and trees, and in every locality upon orchard trees and bushes. The latter furnish abundance of blooms, the apple especially, and the best time to change swarms, or divide them, is when orchard trees are in full bloom.

The first trees to give bloom in the spring, are the red and white maples, the aspens and willows. South of 40 degrees the red bud (Judas tree) is prolific in its bloom. May gives us alder, sugar maple, haws, crab-apple, and nearly all fruit trees and bushes. Late in May and early in June we have the barberry, grape, white wood (tulip tree), sumac, and during June the wild plum, raspberry and blackberry; July will give

bass wood, Virginia creeper and button bush. In the South, all these trees thrive in the hill region ; many of them we do not have in the West, among them the sour wood. In California the pepper tree and red gum, are noted for late bloom. When there is plenty of the plants we have named, the bee-keeper need not fear but there will be an abundance of bloom of many species indigenous, but not mentioned here.

CHAPTER II.

THE GENERAL MANAGEMENT OF BEES.

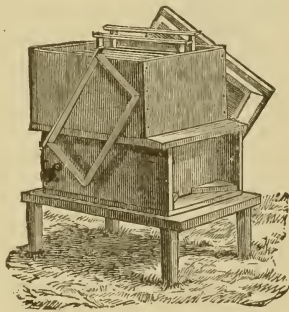
- I. HIVES.—II. NUMBER OF SWARMS PROFITABLY KEPT ON A FARM.—III. SWARMING.—IV. HIVING NEW SWARMS.—V. TAKING THE HONEY.—VI. WINTERING BEES.—VII. IMPLEMENTS OF USE.—VIII. A MOTHERLESS SWARM.—IX. FASTENING EMPTY COMBS IN FRAMES.—X. FEEDING BEES.—XI. ENEMIES OF BEES.—XII. FOUL BROOD.—XIII. CONCLUSION.

I. Hives.

Whatever the hive used—the old fashioned close box hive is now-a-days obsolete—simplicity is the main feature to be considered by the farmer. Have nothing to do with a hive that is full of doors, drawers, traps, or any of these devices to catch the unwary. Leave these to experimental bee-keepers. If comb-honey in frames is desired, about 4,000 cubic inches should be the contents of the hive. If the surplus honey is to be contained in caps, 2,000 cubic inches and even less will be ample for the hive. In any event, the hive should be closely jointed, and carefully put together.

In our opinion the Langstroth hive, or some modification of this form is best, all things considered, for the farmer. Its patent has now expired, and the cut we give shows a hive that any carpenter can make, or the several parts can now be bought ready to be put together of any one dealing in bee-keepers, supplies, packed for shipment. Its working parts are easily adjusted; it is as near moth proof and vermin proof as any hive—none are really so. To the talent of Mr. Langstroth, who during his life labored continuously in simplifying the “mysteries of bee-keeping,” is due, more than to any other one individual, the bringing of this interesting art within the grasp of all.

On the next page are given two illustrations, showing different forms of movable frames, the larger one filled with comb, while the smaller one has **only a few cells**. The smaller frame is only about six or eight inches

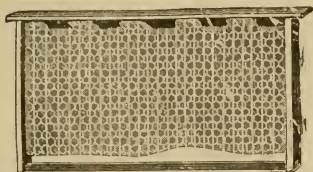


MOVABLE FRAME HIVE.

square, and, when filled with comb, will contain about a pound of honey. A number of them placed side by side, and joined together, will occupy the same space in the hive as the larger frame. The small frames are far more convenient for handling than the larger ones, and by their use the honey can be sold in the frames in quantities to suit retail buyers. Most of the California honey shipped eastward, comes in these small



SMALL FRAME.



MOVABLE FRAME FILLED WITH COMB. movable frames filled with a wired comb foundation, and may also be taken as showing a movable frame filled with comb.

frames just as the bees made it.

As before said, whatever the hive let it be simple; and since none of the standard hives are now covered by patents, a practical man ought to be able easily to judge what suits his idea best. The cut will show one of the

II. Number of Swarms Profitably kept on a Farm.

The great mistake made by farmers in bee keeping is, that they are too eager to increase the number of their swarms. When a few swarms are kept the bees remain healthy and give plenty of surplus honey, because they find plenty of natural forage. Swarms, on the other hand, are extended until ten, twenty, fifty, and even more, are working; then come light crops of honey, disease, moth and other pests, and, at last, starvation puts an end to the experiment. Artificial feeding and precise care may, indeed, prevent this; but the farmer cannot spare the time from his other duties, though the specialist may. We have never been able to keep more than twenty swarms, even on one of the best of feeding grounds, without special care and feeding; and the greatest profit for the least outlay has been from ten or twelve swarms; some locations will not support more than half this number. Every farm range should keep five or six swarms nicely. Our advice, therefore, is, understock rather than overstock.

III. Swarming.

The proper time for bees to swarm is as early in the season as possible. If they have been properly wintered, that is, if they are strong, swarming will begin about the time apple trees are in full bloom. The old adage says,

“ A swarm in May, is worth a load of hay;
A swarm in June, is worth a silver spoon;
A swarm in July, is not worth a fly.”

This it will be well for every farmer to remember. The early swarms become populous, and have plenty of honey before the dry season and heat cut off the honey supply, and can carry themselves through. The late swarm is weak, gets weaker, and finally succumbs to the inevitable.

IV. Hiving New Swarms.

In working about bees, at any time, and for whatsoever purpose, there must be no haste, sudden movements, or excitement of any kind. This is what causes stinging. If you crush a bee, or if it gets pinched in any part of your dress, you will be stung; if not, there is little danger, unless you go about your work in an excitable manner. If you are so unfortunate as to be stung, get out of the way as quietly and quickly as possible; the odor of the sting will excite the whole colony. It is well to protect yourself against stinging in the most perfect manner; a pair of buckskin gauntlets tied securely over the cuffs of the coat, the bottom of the pantaloons tied firmly about the boot tops, thick, loose clothing, and a bee veil afford perfect security to even those whom bees dislike (hasty persons), and to those who fear bees (timid persons). A bee veil is simply a piece of bobinet, large enough to tie over the head, as shown in the cut, and which may be fastened by being tucked under the top of the coat, or tied about the collar.

Have your hives ready, and all prepared beforehand. If the bees are settled upon a handy bush, simply shake them carefully into the hive, as many as you can; cover and place it near where the other bees may enter. If the greater part of the swarm fall on the ground, drive them to the entrance, by gently and carefully sweeping them with something soft. When they begin to enter, leave them alone until evening, when they must be set where they are to remain. If the swarm has settled upon a limb so high that it cannot be reached by a ladder, climb to it, tie a rope securely to the limb beyond where you wish to saw, let the end pass over a limb still higher, and thence to the ground. An assistant holds the end of the rope and eases the limb as it begins to be severed, so it comes down gently, and often without seriously disturbing the bees; pass it gently to the ground, put the bees into the hive, as before directed, and it will be found that this is about all the "mystery" in hiving bees. Watch for indications of swarming, and be ready, and you will seldom lose a swarm.

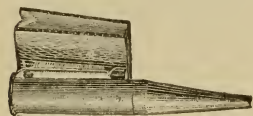


BEE VEIL.

We never knew a swarm to go directly away without clustering, the first time they came out. Hence the beating of tin pans, and throwing water, or sand among an issuing swarm is all nonsense. But if they rise directly up and seem inclined to make off, a good dash of water or sand will often bring them down, probably on the principle that they think it a bad day for swarming. Wire swarm-catchers are sometimes used. A bushel basket on a suitable handle is excellent, when a swarm is to be shaken down from a limb.

V. Taking the Honey.

Never undertake to work about a colony of bees unless you are sure they are filled with honey. At the first alarm of any kind, tapping on the hive, or smoking, their first impulse is to fill themselves with honey, to be ready for any emergency. Once filled, which need not take more than five minutes, they are quiet, and will not sting unless they are hurt; proceed quietly then to remove the honey, and pay no attention to the flying bees—if you do you will get stung. A good form of smoker—very little smoking will do—is given in the cut. A few



BELLOWS AND SMOKING TUBE.



HONEY KNIFE.

whiffs from a smoker's pipe answers very well. If any honey wished to be removed, sticks, loosen it or cut through it with a thin knife. The cut shows the best form of honey knife.

VI. Wintering Bees.

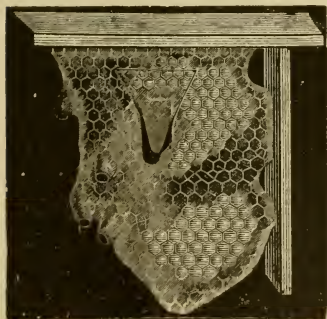
A good stand for bees is a simple shed, tight on the sides and facing the east; the roof should be water-proof; if then you have shutters for the front to be put up in winter, to keep out drifting snow, you have a good place both for summering and for wintering bees. Bees, of course, may be most economically wintered in a cold, dry, light, well-ventilated cellar; but this again belongs to the professional Apiarist, and wants nice management. The healthiest and best place for the farmer to winter bees is in such a house as we have mentioned, further protected with cornstalks, or straw mats. The hives should be placed within twelve inches of the ground; this is, also, the proper distance for summer. The main thing in summer is to guard against extreme heat, and in winter against driving storms, especially snow. Bees will stand extreme cold, if they are healthy, and the hive contains thirty pounds of honey in the autumn. They cannot stand wet, nor snow drifted among them in the hives.

VII. Implements of Use.

In bee-keeping, as in every other art, certain implements and labor-saving appliances are needed. For taking honey from the hives, the bee veil, the smoker and the honey knife are all that is necessary; and where the honey is made in the small movable frames, already described, the knife is discarded. Indeed, the implements of use are but very few, so far as successful bee-keeping is practiced by the farmer. We have figured the smoker and the honey knife. A pipe of tobacco and any well tempered, thin knife will answer. There are centrifugal machines in use for extracting honey from the comb, when it is wanted to be again returned to the hive. A cut of a good form is given. This again belongs more to the professional bee keeper than to the farmer.

VIII. A Motherless Swarm.

Sometimes, from one cause or another, a colony of bees loses the queen or mother bee, and has no larvæ from which to rear another; or, the bee keeper may choose to divide swarms, giving a nucleus of three frames. These are taken from the center frames of other hives; take bees and all, but be sure the queen is left in the old hive, and shake among those in the nucleus hive the bees from two or three more frames, so that after the departure of those that will naturally leave and return to their old homes, enough will be left to keep up the requisite warmth in the hive. First, however, you must find a frame containing one or more capped queen cells; cut a triangular piece out of



FURNISHING A QUEEN CELL.

well to know how, in case it becomes necessary to furnish a queen cell to an unfortunate swarm

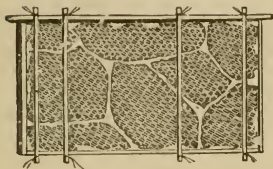


CENTRIFUGAL EXTRACTOR.

one of the frames to be inserted in the nucleus swarm, cutting away the bottom as shown in the illustration, so there shall be no danger of compression of the queen cell. Then cut a piece containing a queen cell from the other frame, and fasten it to the frame—see the illustration, also showing other queen cells—and after putting this in the nucleus hive, put in the other two frames and bees as directed. We could hardly advise the farmer bee-keeper to adopt this plan, but it is

IX. Fastening Empty Comb in Frames.

On page 1102 is a cut of a wired comb foundation; any comb even in pieces may be utilized by a little cutting and fitting, and temporarily fastened with wire or thin narrow strips tied top and bottom as shown in the annexed cut, until the bees secure it, which they will do in a day or two.

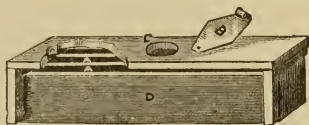


UTILIZING PIECES OF COMB.

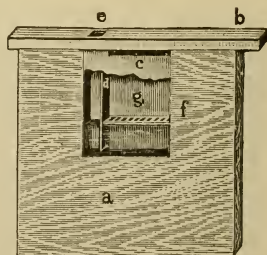
X. Feeding Bees.

If a swarm, from lack of forage, becomes insufficiently supplied with honey to carry them through the winter, or if it be found that they lack food in the early spring, they must be fed. The best thing is strained honey, of course; the only other admissible thing is granulated sugar made into a syrup of the consistency of honey. If the object be to stimulate bees to commence rearing brood early, a half pound to a pound of sugar a day, early in the spring and continued until bloom is plenty will be sufficient. If they are starving, enough must be given to fully supply their wants and some to spare. If the bees require feeding in the fall, it should be given in such quantities that they may begin the winter with fully thirty pounds of capped honey per swarm. It is best not to *guess* at the weight; mark the weight of every empty hive plainly on it before the bees are put in, and then you may know pretty nearly how much honey the swarm has by the *sure* test of weighing.

We give two cuts, one of the feeding box invented by Mr. Shuck, the



SHUCK'S BEE FEEDER.



COOK'S DIVISION BOARD AND FEEDER.

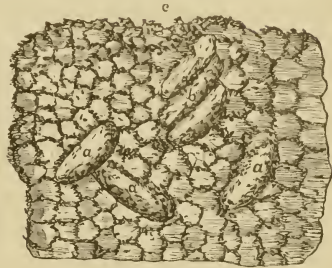
other Professor Cook's combined division board and feeding box. Any suitable vessel that will hold honey, with a float on top, pierced with holes, that the bees can feed through, will answer well enough, and this may be placed in the upper chamber of the hive, secure from other bees.

XI. Enemies of Bees.

There are many enemies of bees, among them the mosquito hawk, or



BEE MOTH.



WORK OF THE LARVÆ IN COMB.

devil's darning-needle, as it is sometimes called. The bee-killer (*Asilus*) is a two winged fly, which seizes the bee and sucks its fluids. A Tachina fly has the reputation of laying its eggs in the bodies of bees occasionally. Large spiders rarely entangle bees in their nets. Ants sometimes depredate on bees. These, however, may be provided against, as may mice, toads, and the king bird. The worst enemy to bees is the moth, which, if a swarm is not strong, will soon ruin it entirely with the webs and larvæ. The moth lays its eggs in the minutest crack, and the young find their way into the hive, where they soon destroy the swarm by filling everything with their webs, as they progress. Their manner of working is shown in the cut entitled "work of the larvæ in comb."

XII. Foul Brood.

This fungous disease of bees, once it gets a foothold in an apiary, generally carries destruction with it. It is quite contagious; Schonfeld, of Germany, not only infected the healthy larvæ of bees with the germ, but other insects also. The symptoms are a steady decline in the colony; the brood becomes brown and salvy, and gives off a bad smell like that of putrefaction. The spores are in the honey and the bees eating this and feeding it to the young brood, infect them. A remedy said to be successful in eradicating the disease is as follows:

- 8 Grains salicylic acid,
- 8 Grains soda borax,
- 1 Ounce rain water.

Or in this proportion for the quantity needed. Uncap all the brood and throw the solution over the comb with a spraying machine.

XIII. Conclusion.

Those who wish to go into bee-keeping extensively must educate themselves by means of books written particularly on the subject of bees in all

the minutiae of their care. What we have given is a guide to those who, like the writer, may wish to keep a few swarms of bees.

The trying time for bees in the West is the extreme cold of our winters, and the droughts of summer. These must be guarded against. The same care must be exercised with bees as with any other farm stock. No farmer of sense would overstock his pasture; do not, therefore, imagine because bees have the power of flight that they can forage indefinitely. They cannot. Their extreme power of flight is about three miles. Their most economical working range is, according to our observation when the country was new, only about one-half mile. They must first find flowers before they can get honey. Hence our advice, before increasing your swarms largely, be sure those you already have are somewhat lazy.

It is not hard to tell if your neighbor's bees and your own are overlapping on the feeding grounds. Dust a little flour on a bee, after it has filled itself from a saucer of honey offered to it. See which way it flies, and if it flies away from home, be sure that either your neighbor is overstocked, or else that you have not enough. Remember, however, that a few heavy swarms are better than many weak ones. It is the honey you are after, and not numbers of swarms. In handling bees, do so deliberately and sagaciously, and you will not be stung. Do not make experiments largely in new hives, or in bee foods. Stick to a simple form of hive, and pure sugar syrup as food. Keep no more swarms than can easily forage to the full capacity of the hives. Take surplus honey as soon as it is ready, and keep plenty of empty boxes on hand for the honey harvest. But be very careful how you allow your cupidity to rob the hives in the fall, lest bees may not have enough to amply carry them through the winter, and fully up to the time when flowers are plenty

GLOSSARY OF SCIENTIFIC AND OTHER TERMS, IN GENERAL USE,
WITH THEIR DEFINITIONS.

- Ablactation*—A weaning or cessation from suckling.
- Abomasum*—The last or fourth stomach of ruminating animals.
- Abdomen*—The portion of the body containing the stomach and intestines ; the belly.
- Abnormal*—That which is not natural or regular.
- Abortion*—The casting of the young in an unnatural manner, and before the proper time.
- Abrade, Abrasion*—To rub off, to wear away by contact, as rubbing off the surface of the skin, producing galls.
- Abrupt*—Quick, sudden ; an abrupt turn or twist in the intestine may produce strangulation of the parts.
- Abscess*—A swelling and its cavity containing pus or matter. A cavity containing pus.
- Abscission*—The cutting away or removal of a part.
- Absorb*—Swallowing up, drinking in.
- Absorbent*—In anatomy, those vessels which imbibe or suck up, as the lacteals or lymphatics. In medicine, any substance, as chalk, magnesia, etc., used to absorb acidity in the stomach.
- Absorption*—The taking up by the vessels of the body of any substance either natural or unnatural, as the serum of dropsical swellings.
- Acardiastrophia*—Atrophy or wasting of the heart.
- Accephalæmia*—Anæmia, or lack of blood, in the brain.
- Accelerate*—Growing quicker or faster, as an accelerated pulse.
- Acid*—Sour. The last fermentation before the putrid.
- Acidulate*—To make slightly sour, as with lemon, vinegar, or the mineral acids.
- Accretion*—Increase, or growing as an exostosis or unnatural growth of bone.
- Aceni*—Stony growths of the liver, resembling berries.
- Acrid*—Sharp, pungent, biting, irritating, as the strong acids.
- Acute*—Severe, sharp. In diseases, those which soon come to an end in contradistinction to chronic.
- Action*—The paces of a horse, either natural or acquired.
- Actual*—The production of an immediate effect, as by the use of a hot iron (actual cautery) in contradistinction to the effect of escharotics, as a caustic application.

- Acupressure*—Arresting hemorrhage, as by means of a needle passed twice through a wounded substance at the side next the heart.
- Adamantine Substance*—The enamel of the teeth.
- Adenitis*—Inflammation of a gland or glands.
- Adermatrophia*—Atrophy (wasting) of the skin.
- Adhesion*—A joining together, as the union of parts in healing.
- Adhesive*—That which adheres, as certain plasters.
- Adipose*—Fatty matter; belonging to fat.
- Adolescence*—The period between puberty (the age of procreation) and the full development of the physical system.
- Adult*—The age succeeding adolescence, and preceding old age.
- Aerate*—Mixing with air, as the blood in the lungs, by which it absorbs oxygen.
- Edœa*—Genital organs.
- Ætiology*—Relating to the doctrine or probable cause of a disease.
- Affection*—Disease, or disease of some particular part.
- Affinity*—The attraction which causes particles of bodies to adhere and form compounds. That which causes substances to cohere.
- Affluence*—Determination of the blood or of humors to a part.
- Albuminuria*—That condition in which the urine contains albumen and an excess of urea, coagulable by means of nitric acid and heat.
- Albumen*—Substances, animal and vegetable, resembling the white of an egg.
- Aliment*—Solid or liquid substance taken as food.
- Alimentary Canal*—The bowels.
- Alkali*—Any substance which will neutralize an acid, as magnesia, soda, potash, etc.
- Alkaloid*—A salifiable base existing in some vegetables, differing from alkali in composition and general properties, and having nothing in common except their basic properties. Brucia, emetia, morphia, strychnia, etc., are alkaloids.
- Alter*—A term in common use for castration.
- Alterative*—A medicine changing the functions and condition of the organs of the body.
- Alum*—Sulphate of alumina and potassa.
- Alveoli*—The sockets in the jaw bone in which the teeth are situated.
- Amaurosis*—Partial or total loss of vision from paralysis of the retina.
- Amputation*—The operation in surgery of cutting off a limb.
- Anæmia*—Poverty of the blood as opposed to plethora. Too few red corpuscles and too many white corpuscles in the blood.
- Anasarca*—Dropsical swellings as of the limbs, abdomen, chest, etc.
- Anbury*—A soft spongy tumor.

- Aneurism*—Dilatation of an artery producing a tumor; lesion of an artery; dilatation of the heart.
- Analysis*—Separation into parts; resolving into the original elements.
- Anatomy*—The art of dissecting, or separating the different parts of the body. The science of the structure of the body, as learned by dissection.
- Anchylosis*—The stiffening or rendering rigid a joint.
- Anæsthetics*—Agents which deprive of sensation and suffering, as chloroform, ether, etc.
- Anodyne*—A medicine to allay or diminish pain.
- Anomalous*—Deviating from the general character or rule.
- Antacid*—Opposed to or an antidote to acids.
- Antagonism*—Opposed in action; one contradicting another.
- Anterior*—Before; in front of another part.
- Anthelmintic*—Medicine to kill or expel worms.
- Antidote*—That which counteracts hurtful or noxious substances. A remedy to counteract the effects of poison.
- Antiperiodic*—Medicine to arrest or retard the return of a paroxysm in periodic disease.
- Antiseptic*—Agents for preventing, arresting or retarding putrefaction.
- Anus*—The fundament, or lower portion of the bowel at the tail.
- Aperient*—Laxative medicine; that which gently operates on the bowels.
- Aphtha*—**Ulceration** of the mouth, beginning with minute vesicles and ending in white sloughs.
- Apoplexy*—Sudden effusion of blood into the substance of the brain. Sometimes used for effusion into the substance of other organs or tissues.
- Approximate*—Coming near to. An approximate cure is by inoculating for another disease.
- Aqueous*—Watery; having the property of water, as watery matter, aqueous pus.
- Aromatic*—Strong smelling stimulants, given to dispel wind and relieve pain.
- Artery*—Blood vessels which carry the red blood from the heart.
- Articulate*—Joining, working together or upon one another, as the bones.
- Asthma*—A disease attended with difficulty of breathing, and a sensation producing wheezing, coughing and other distressing symptoms.
- Asphyxia*—Death from strangulation of the lungs, from want of air.
- Asthenopia*—Weakness of the sight or vision.
- Assimilate*—To make like another; assimilation of food in the nutrition of the body.

- Astragalus*—The largest bone of the hock-joint, lying below the os calcis.
- Astringent*—That which causes contraction of the bowels or vital structures. Astringents are medicines which suppress discharges, as from the bowels, blood, mucus.
- Attenuate*—To draw out, to make thin, reduce in size.
- Atrophy*—Wasting of a part, as the muscles.
- Atlas*—The first bone of the neck or first cervical vertebra.
- Atony*—General weakness, want of tone.
- Augment*—To increase.
- Auricle*—The external part of the ear; also parts of the heart, one on each side resembling ears.
- Auscultation*—The act of listening to sounds given by different parts of the body when struck, especially to the sounds produced by the functional motions of the lungs and heart by percussion.
- Balk*—To refuse to pull, or to refuse to go forward at command.
- Bars*—(Of the hoof.) The two ridges of horn, passing from the heels of the hoof toward the toe of the frog. (Of the mouth.) The transverse ridges on the roof of the mouth of the horse.
- Base*—The lower part, as the base of the brain; the foundation.
- Beneath*—Under a certain part.
- Bicipital*—Two headed, as biceps muscles, bicipital groove, etc.
- Biliary*—Belonging to or pertaining to bile. Biliary duct, a canal containing bile.
- Biology*—The doctrine of life, or of living bodies.
- Bioplasm*—The so called living or germinal self-propagating matter of living beings.
- Biped*—Two footed.
- Bolt*—To swallow the food hurriedly without proper chewing.
- Bolus*—Medicines formed into a round or conoidal mass, for ease in administering, often termed a ball. The cylindrical shape is the proper one.
- Boot*—Buffer, a leather band, worn to prevent one foot cutting the other in traveling.
- Bots*—The grub of the fly *equus equi*, when in the stomach of the horse.
- Bougie*—An instrument for opening the urethra, or urinary, or other passages.
- Bounded*—Parts lying about another, surrounded by.
- Breeding-in-and-in*—Breeding to close relations, in the same sub-family, as the produce of the same sire but of different dams, or of the same sire and dam.

- Broxy*.—A term often applied to a number of fatal diseases of sheep, especially to a form of anthrax or carbuncular fever.
- Bronchia*.—The first two branches of the wind-pipe. Bronchitis is an inflammation of the bronchia.
- Bronchotomy*.—The operation of cutting into the wind-pipe.
- Cadaverous*.—Having the appearance of a dead body.
- Cæsarian operation*.—To cut into the womb by way of the abdomen, when natural delivery cannot be accomplished.
- Calcareous*.—Containing lime, lime-like.
- Calculus*.—Any hard, solid concretion found in any part of the body, as stone in the bladder, gall-stones, etc.
- Calefacient*.—Anything producing warmth.
- Calks, or Calkins*.—The heel of the horse-shoe when turned down to prevent slipping.
- Callous*.—Induration; a hard deposit; excess of bony matter.
- Camel-backed*.—Hump-backed.
- Canal*.—A tube or passage—as the alimentary canal, (throat), tympanic canal, etc.
- Cancer*.—A hard, unequal, ulcerating tumor, which usually proves fatal.
- Canine Teeth*.—The teeth between the lateral incisors and the small molars of the jaw.
- Canker*.—Eroding ulcers of the mouth; virulent, corroding ulcers. Any sore which eats or corrodes.
- Cannon-bone*.—The shank, or bone below the knee or hock. The metacarpal or metatarsal bone of the horse.
- Cantharis*.—A coleopterous insect. The *cantharis vesicatoria*; powdered, it is the active principle in ordinary blistering plasters.
- Canula*.—A hollow tube of metal or other substance, variously used in surgery.
- Capillary*.—Hair-like; applied to the minute ramifications of the blood vessels.
- Capped Hock*.—A swelling on the points of the hock of the horse.
- Capsicum*.—Cayenne pepper. The small, long red pepper.
- Capsular Ligaments*.—Ligaments surrounding the joints.
- Capsule*.—A membranous bag or sac.
- Carbon*.—Woody matter. Charcoal is impure carbon; the diamond is pure carbon. Carbonic acid is expelled from the lungs in the act of breathing. Carbonic oxyde in the blood or lungs is fatal to life.
- Cardia*.—The superior or *œsophagal* orifice of the stomach; and of the heart.
- Caries*.—Ulceration of the substance of the bones.

Carminatives—Warming, stimulant, aromatic medicines, used in colic and wind.

Carotid Canal—A canal in the temporal bone, through which the carotid artery, and also some nervous filaments pass.

Cartilage—Gristle; the substance covering the ends of bones, moving and working upon each other.

Caseine—The nitrogenized constituent of milk. Blood fibrin and albumen is identical in composition.

Castrate—To geld, emasculate, deprive of the testicles.

Cataplasma—A poultice, either medicated or not. It sometimes takes name from the special agent employed, as *sinapism*, a mustard poultice.

Catarrh—A cold attended with running of the nose.

Cataract—An opacity of the crystalline lens of the eye, causing partial or total blindness.

Cathartic—Purgative medicine, used for freely opening the bowels.

Catheter—An instrument used for drawing the water from the bladder, and for other purposes.

Caustic—Any burning agent, as potash, nitrate of silver. To cauterize is to burn, generally applied to the use of the hot iron in diseases.

Cavity—A depression, as the cavity of a wound.

Cellular tissue—The membrane or tissue which invests every fiber of the body, composed of minute cells communicating with each other, and which serve as reservoirs of fat.

Cephalic—Pertaining to the head.

Cerebral—Pertaining to the brain.

Cervical—The neck; belonging to the neck.

Characteristic—A symptom of character. Characterize, to distinguish.

Chalybeate—Containing iron. Any medicine of which iron forms a part.

Chemical—Relating to chemistry.

Chemistry—The science which investigates the composition of substances, and the changes of constitution produced by their mutual action.

Chirurgical—Belonging to surgical art.

Cholagogue—Medicines to increase the secretion of the bile.

Cholechloride—A medicine which increases the evacuation of the bile. Chole, the bile.

Chondritis—Inflammation of cartilage.

Choroiditis—Inflammation of the choroid coat of the eye.

Chronic—A lingering, long-standing disease, succeeding the acute stage. A seated, permanent disease.

Chyle—The milky liquid, as taken from the food during digestion, and prepared from the chyme, and ready to be absorbed by the lacteal vessels before being poured forth into the blood.

- Chyme*—The food modified and prepared by the action of the stomach.
- Cicatrice*—The scar left after the healing of a wound or ulcer.
- Circumscribed*—Limited. In pathology applied to tumors distinct at their base from the surrounding part.
- Circulation*—The vital action which sends the blood through the arteries, and back again through the veins to the heart.
- Cleft*—A mark; division; furrow.
- Clyster*—Liquid medicine injected into the lower intestine.
- Coagulate*—To clot, as the blood when drawn.
- Cohesion*—Connected; adhering together; sticking together.
- Colic*—Acute pain in the abdomen, intensified at intervals.
- Collapse*—A falling together. A closing of the vessels. **Extreme depression** of the vital powers.
- Colon*—The largest of the intestines, or more properly, the largest division of the intestinal canal.
- Coitition*—The act of copulation; union of the sexes.
- Coma*—Lethargy. Drowsiness produced by depression of the brain and other causes.
- Comatose*—Constant propensity to sleep.
- Conception*—Fecundation by action of the male.
- Condition*—A healthy, serviceable state of the system. **A firm state of the muscular tissue.**
- Congenital*—Born with another; of the same birth. **Belonging to the individual from birth.**
- Congestion*—An accumulation of clogged blood in the vessels, or in the parts, as the lungs, brain, etc.
- Constrict*—Drawing or binding together, as constriction of the muscles of a part.
- Contagions*—A disease that may be communicated by contact, or the matter communicated, or proceeding from the breath, or emanations of the body.
- Contorted*—Twisted, twisting, writhing, as the body in pain, or from the result of disease.
- Contusion*—A bruise; a wound made by a blow or bruise.
- Convex*—Having a rounded surface. The opposite of concave.
- Concretion*—Adherence of parts naturally separate. In chemistry, **condensation** of fluids or other substances into more solid matter.
- Condiment*—Substances used to improve or heighten the flavor of food.
- Confluent*—Running together, as in pimples or pustules when they become confluent.
- Constipation*—A state of the bowels in which the evacuations are **unnaturally hard.** A stoppage of the evacuation of the bowels.

Continuity—Parts united so completely that they cannot be separated without laceration or fracture.

Convalescent—Returning to health after sickness.

Convolved—Rolled together or upon itself. The cerebrum is convoluted.

The irregular foldings of the intestines are convolutions.

Copious—Plentiful, abundant, as a copious discharge.

Core—The hard portion of purulent matter, as in boils.

Corn—A diseased portion of the foot,—in the horse, between the bar and the quarter, usually on the inside.

Coronet—The upper part of the hoof, just where it joins the skin.

Corrosive—That which eats away, destroying the texture of the living body.

Corrugation—Contracting the skin into wrinkles.

Costa—A rib. Costal: belonging to the ribs.

Counter Irritation—An application to irritate one part to relieve pain in another. A blister or mustard poultice produces counter irritation.

Cow-pox—Peculiar pustules upon the teats of cows, from which the vaccine matter is obtained, used to prevent contagion from small-pox, or to mitigate the intensity of the disease.

Cranium—The skull. Cranial: pertaining to the skull.

Crest—The back or upper part of the neck of the horse.

Crepitation—Applied to the noise made by the ends of fractured bones, when they grate together. The sound produced by pressing together cellular tissue in which air is contained.

Cribbing (of horses)—The act of seizing any hard substance, or pressing thereon with the teeth, and gulping; sometimes called wind sucking, though the latter is not necessarily cribbing.

Crisis—In disease, that point or period which determines a favorable or unfavorable termination.

Crop—The craw or first stomach of a fowl.

Cruor—The red colored portion of the blood.

Crupper—The buttocks of a horse.

Crural—Pertaining to the legs, as the crural arteries and veins.

Crust—The hoof, so-called. The outside laminae of the hoof.

Crusta—A scab.

Cul-de-sac—A passage closed at one end.

Cuneiform—Formed like a wedge.

Curb—A soft swelling, becoming hard, situated on the back part of the hind leg, just below the point of the hock.

Cuticle—The epidermis or scurf skin. The skin is composed of the *cutis vera*, *retia muscasum* and *cuticula*.

Cutaneous—Of the skin, as a cutaneous affection.

Cyst, Cystis—A small bladder or sac ; applied to those containing morbid matter or parasites, which become encysted, or inclosed in an envelop.

Cystic Duct—The duct which proceeds from the gall bladder, uniting with the hepatic duct.

Cystitis—Inflammation of the bladder. Cystoplegia is paralysis of the bladder.

Debility—The condition of weakness or feebleness.

Decoction—Extraction of the soluble parts of substances by boiling.

Decompose—To decay. To separate into component parts.

Defecation—Purifying from impurities of foreign matter. Voiding the excrement from the body.

Degenerate—To become worse or inferior.

Deleterious—Injurious, poisonous or destructive.

Delirium—Insanity ; a wandering of mind in disease.

Deliquescent—Any salt which becomes liquid by attracting moisture from the air.

Demulcent—That which sheaths and protects irritated surfaces.

Dens—A tooth. Dental : pertaining to the teeth. Dentition : the development of the teeth.

Depilatory—Any agent or thing which causes the loss of the hair.

Dermal—Belonging to the skin.

Desiccate—To make dry by heat.

Detergents—Medicines having the power of cleansing the vessels or skin.

Develop—To increase. A disease develops its intensity. To show increasing muscular form. Bringing to perfection.

Diabetes—An excessive flow of urine containing saccharine matter.

Diagnosis—The distinguishing of one disease from another.

Diaphoretic—A medicine which causes perspiration or sweating.

Diaphragm—The midriff. The membrane, or broad muscle, which divides the thorax or chest from the abdomen or belly.

Diarrhœa—A continued and profuse discharge from the bowels.

Diet—Any kind of food or drink. Dietary : a regulated allowance of food.

Diffuse—To extend or drive out. That which may flow or spread, as a diffusible stimulant.

Digestion—The separation and dissolving of the food in the stomach.

Digestive ointment has the power of resolving tumors.

Dilate—To open wide, as dilation of the eye.

Dilatation—The expanding of a body, as of the heart, arteries, the bladder, etc., from over-fullness.

Dilute—To make thin, as a medicine with water, with oil, etc.

Diminution—A lessening, or decreasing, as of pain, etc.

Diploma—A document granted by a legally chartered college, showing that the person named is entitled to practice his or her profession.

Disinfectant—An agent capable of neutralizing morbid effluvia, or the cause of infection.

Dislocation—Putting out of joint.

Disorganization—A complete morbid change in, or even total destruction of, the structure or texture of an organ.

Dissection—Exposing the different parts of a dead body, that their arrangement and structure may be studied.

Distorted—Deformed, crooked, out of the natural shape.

Distend—To stretch out, or swell.

Diuresis—An extraordinary or abundant excretion of urine.

Diuretic—A medicine to increase the flow of urine.

Doctor—In a common sense, applied to a person legally qualified to practice medicine. In its real sense, applying to various titles, as Ph. D., Doctor of Philosophy; D. D., Doctor of Divinity; LL. D., Doctor of Laws.

Domestic—Relating or belonging to the home or farm.

Dorsal—Pertaining to the back. The dorsal column: the back-bone.

Drachm—The eighth part of an ounce.

Drastic—Powerfully acting medicines or poisons.

Drench—Liquid medicine given by the mouth.

Drug—Originally, a medicine in its simple form, but now applied to medicines generally.

Duct—A tube for conveying a fluid or the secretions of the glands.

Duodenum—The first portion of the small intestine, through which the bile is poured.

Dura Mater—A fibrous, semi-transparent membrane, lining the cavity of the cranium, and containing the brain, (of which it may be considered the outer membrane), and protecting the same by its thickness and great resisting power.

Dysentery—Inflammation of the mucous membrane of the large intestines, producing mucous or bloody evacuations.

Dyspepsia—Serious derangement of the digestive functions.

Dysphagia—Difficulty of swallowing.

Dyspnœa—Difficulty of breathing.

Dysuria—Painful and incomplete passage of urine.

Ecbolics, Parturients—Agents causing the contraction of the womb.

Ectozoön—Parasites, as lice, infesting the surface of the body. Entozoa: parasites within the body.

Eczema—Small pustules crowded together, not contagious, but producing a smarting pain.

- Effluvia*—Morbid exhalations of the body ; sometimes applied to animal and vegetable odors.
- Effusion*—A flowing out, as of the blood, water or lymph, into the tissues.
- Ejection*—Casting out, as ejecting improper matters from the stomach.
- Elastic*—The property of springing or stretching.
- Elephantiasis*—Chronic lymphangitis, by which the limb is enlarged, resembling the leg of an elephant.
- Emasculation*—Removal of the male generative organs ; castration.
- Embryo*—The impregnated ovum in the womb, after growth has commenced.
- Emetic*—A medicine given to produce vomiting.
- Emollients*—Agents which have the power of softening or relaxing.
- Empiric*—One whose skill is experimental, or the result of mere experience.
- Enamel*—The hard outer covering of the teeth.
- Encysted*—Enclosed in a sac.
- Enema*—Medicines given by injection into the bowels.
- Engorgement*—In animals, vascular congestion, the result of over-feeding.
- Enteric*—Belonging to the bowels.
- Enteritis*—Inflammation of the bowels.
- Enteroraphy*—The sewing together of the divided edges of the intestines.
- Epidemic*—Disease that affects a large number, as though carried in the air.
- Epiglottis*—The covering of the glottis. A tongue-shaped projection, to prevent food or liquids from entering the wind-pipe.
- Epizoötic*—Contagious disease, attacking large numbers of horses at one time. Applied to catarrhal fever in influenza, which spreads rapidly.
- Equine*—Belonging to the horse.
- Equitation*—The art of riding on horseback.
- Eruption*—Pimples, blisters, rash, etc., breaking out on the skin.
- Esophagus*—The gullet, or tube of the throat which conveys food to the stomach.
- Essence*—The properties or virtues extracted from any substance.
- Evacuate*—To empty or pass out, as to evacuate the bowels.
- Ewe-necked*—In the horse, having a neck like a shorn sheep.
- Exanthema*—Eruption of the skin, with fever.
- Excision*—Cutting out, or cutting off, any part.
- Excoriate*—To tear or strip off the skin ; to wear away or abrade ; to break the skin in any manner, as in galling, or with acrid substances.
- Excrement*—Refuse matter. The dung.
- Excrecence*—Unnatural or superfluous growth.

- Excreting*—Throwing out from the body.
- Excretion*—The act of throwing off effete matter from the animal system; that which is thus thrown off.
- Exfoliation*—Separation or scaling off of dead from living bone. Separation of scales (laminae) from any substance.
- Exhale*—Breathing out, evaporating.
- Exostosis*—Unnatural growth or projection of bone.
- Exotic*—Foreign. That which belongs naturally to another district than our own.
- Extensor-tendon*—The tendons which stretch out the limbs.
- Extirpation*—The complete removal of a part by means of the knife.
- Extravasate*—To let out of the proper vessels, as blood, after the rupture of a blood-vessel.
- Extremities*—The limbs.
- Exudation*—A sweating, or passing out of a liquid through the walls or membranes containing it.
- Exude*—To discharge through the pores.
- Facial*—Pertaining to the face.
- Fæces*—The excrement.
- Farcy*—A disease of the lymphatics of the skin of the horse. Also, a disease allied to glanders.
- Fat*—The well known animal substance, whose natural function it is to protect the organs, maintain the temperature, and nourish in case of need.
- Febrifuge*—A medicine to lower the temperature of the body, and counteract fever.
- Feculent*—Foul or impure matter, formed by the breaking down of the tissues; excrementitious matter.
- Femur*—The thigh bone proper.
- Fermentation*—Incipient decomposition of vegetable substances, from souring.
- Fester*—To suppurate, and discharge corrupt matter.
- Fetid*—Having an offensive odor.
- Fibrin*—An organic substance found in the blood, and composing a large part of the tissues of the body. Fibrous membrane: a membrane composed of fibres.
- Phula*—The small or splinter bone of the leg. The outer bone of the hind leg of the horse, etc.,—much smaller than the tibia.
- Filtration*—Straining a liquid to clarify it.
- Fissure*—An opening, a crack.
- Fistula*—A deep, narrow ulcer, having a passage leading to it.
- Fistulous*—Resembling a fistula, either in form or nature.

- Flanks*—That part of the horse between the false ribs, hips and stifle.
- Flatulent*—Affected with, or caused by, the generation of gas or wind in the stomach and intestines, as flatulent colic.
- Fleam*—An instrument used for bleeding the larger domestic animals.
- Flex*—To bend, as the head, neck or limb; as, a muscle flexing the arm.
- Flexor*—A muscle whose office it is to bend a part; in opposition to extensor.
- Florid*—Red or scarlet like, from excess of blood in a part.
- Fœtus*—The young, yet unborn.
- Fomentation*—The application of warmth and moisture, as with a liquid or poultice.
- Foramen*. A cavity pierced through and through.
- Forceps*—Long pointed pincers or nippers.
- Fracture*—The breaking of a bone.
- Friction*—Exciting circulation by rubbing.
- Fumigate*—The application of smoke or vapor.
- Function*—The office or duty of any part of the body.
- Fundament*—The anus or extremity of the bowel. The end of the gut.
- Fungus*—An unnatural growth resembling mushrooms.
- Gall*—The fluid contained in the gall-bladder, consisting, principally, of the bile secreted by the liver.
- Ganglion*—A collection or bunch of nerve fibers, causing the enlargement of a nerve, and resembling a knot.
- Gangrene*—The mortification or death of any part of the body, or of any of its tissues.
- Gas*—An emanation, or invisible fluid, generated in the body.
- Gastric*—Pertaining to the stomach.
- Gastritis*—Inflammation of the stomach.
- Gelatine*—Animal jelly.
- Generate*—To beget offspring; begetting or producing young; breeding.
- Genital*—Relating to reproduction of young, or to the generative parts.
- Gland*—A structure for secreting certain fluids of the body, and containing a tube.
- Gestation*—The condition of pregnancy, or being with young.
- Glanders*—An exceedingly contagious disease, which is incurable and fatal.
- Gleet*—Thin matter issuing from an ulcer. In horses, applied to nasal gleet exclusively.
- Glottis*—The narrow opening at the top of the windpipe.
- Graminivorous*—Feeding on grass and other vegetable food.
- Granivorous*—Feeding on grain or seeds.

Granulate—To grow or develop in the form of grains, as new flesh in the healing of wounds.

Gravel—Calculous matter found in the kidneys.

Gravid—The state of being with young.

Gullet—The œsophagus, or food pipe leading to the stomach.

Haggard—Worn down; thin; ghastly; deathlike.

Haunch—That part of the body which lies between the last ribs and the thigh. In the horse, the bony region of the hips.

Haw—The process of the eye-socket, which is thrown over the eye to clear it of foreign substances.

Hæmal—Relating to the blood.

Hæmatin—The coloring matter of the blood.

Hectic—A constitutional and remitting fever exhibited in consumption; produced also by ulcers, sores, etc.

Helix—The outer circumference or ring of the external ear.

Hemorrhage—A discharge of blood from the vessels containing it.

Hepatic—Belonging to the liver.

Hepatitis—Inflammation of the liver.

Hepatized—Converted into a liver-like substance.

Herbivorous—Feeding on herbs.

Hereditary—Inbred from the parents, as disease, color, vices, and other peculiarities.

Hermaphrodite—Possessing the attributes of both sexes, in a greater or lesser degree; being of, or including, both sexes. Said of animals, plants or flowers.

Hernia—Rupture, or soft tumor formed by the protrusion of any of the viscera of the abdomen.

Hippopathology—The science which treats of the diseases of horses; the leading branch of veterinary science.

Homogeneous—Being of the same kind or quality throughout.

Hue—Color.

Humor—Any fluid of the body, excepting the blood.

Humerus—The upper arm-bone; upper bone of the fore-leg.

Hybrid—The offspring of two different species of animals, as of the horse and ass (the mule).

Hydragogue—A medicine which removes effused fluids from the system.

Hydrocephalus—Water in (dropsy of) the head.

Hygiene—The preservation of health and prevention of disease.

Hypertrophy—Excessive growth.

Hypodermic—Beneath the skin. Used principally of medicines—as morphia, etc.,—applied by injection under the skin.

Hysterics—A nervous disability, mostly among females.

Ileum—The lower part of the small intestine.

Impotence—Inability to perform the sexual function.

Impregnation—The act of rendering, or state of being, pregnant.

Incision—Cutting into; a clean cut; cutting, as in any operation performed.

Incontinence—Inability to retain the natural evacuations.

Induration—The hardening of a part from the effects of disease.

Incisors—The front teeth of the jaws.

Infection—Communicating disease by miasma or emanations from a diseased body.

Influenza—An epidemic disease, causing general depression, with fever.

Infusion—Liquid produced by steeping an insoluble substance in water, without boiling.

Ingesta—Food taken into the stomach.

Inhalation—A drawing into the lungs; the inbreathing of medicated or poisonous fumes.

Inject—To throw in artificially, as from a syringe.

Injection—Liquid medicine thrown into a natural or artificial cavity.

Inoculation—The production of disease by virus or matter from a sore, communicated from one animal to another.

Instinct—Sense, as applied to animals.

Integument—The covering which invests the body (the skin), or a membrane covering any particular part of it.

Intercostal—Between the ribs.

Interfering—The cutting of one foot or leg with the other.

Intermittent—In fevers, a characteristic by which the paroxysms intermit or cease, returning at regular, or nearly regular, intervals.

Interstices—The minute spaces between the particles of a body.

Intestines—The bowels. The alimentary canal, leading from the stomach to the anus.

Invert—To turn about or upside down.

Invigorators—Strengthening medicines, or agents.

Iris—The circular membrane of the eye floating in the aqueous humor, and perforated to form the pupil.

Isomeric—Composed of the same elements in the same proportions, but chemically and physically different.

Issue—A running sore, artificially produced, and kept open to relieve irritation or morbid action in a neighboring part.

Jaundice—A diseased condition resulting from derangement of the liver, and characterized by great lassitude, and by yellowness of the eyes, skin and urine.

Jejunum—That part of the small intestines comprised between the duodenum and ileum.

Jet—The peculiar flow of blood from the arteries, in a spurting motion.

Jugal region—The region of the cheek-bone.

Jugular—The large vein of the neck.

Labial—Belonging or relating to the lips.

Lacerate—To tear. A lacerated wound is a torn wound.

Lachrymal—Pertaining to the tears. The lachrymal duct is the duct leading from the eye to the membrane of the nose.

Lactation—The act of giving suck, or time of suckling.

Lactiferous—Bearing or conveying milk; as, a lactiferous duct.

Lamella—A thin plate or scale of anything; pertaining to the anatomy of the hoof.

Laminitis—Founder; a disease consisting of inflammation of the parts between the pedal or coffin bone and the sensitive laminae.

Lancinating—Sharp, acute, shooting, in a manner as if tearing; thus, a lancinating pain.

Languor—Weakness, faintness, debility.

Laryngitis—Inflammation of the larynx.

Larynx—The swell at the upper part of the wind-pipe, and extending into the throat.

Lateral—At or to one side.

Laxative—A medicine which gently opens the bowels.

Lens—In ocular anatomy, a portion of the eye situated immediately back of the cornea.

Lesion—Disease of a structure; any hurt or injury.

Levator—A general name for a muscle whose office it is to raise some part, as the lip or eyelid.

Ligaments—The bands of the joints binding them strongly together.

Ligature—Silk or flax thread, or any material suitable for tying arteries.

A bandage used in the operation of bleeding.

Liniment—A fluid medicine employed externally and with friction.

Liquefaction—The act or process of reducing a solid substance to a liquid form.

Lithotomy—The operation of extracting stone from the bladder, by cutting.

Liver—The largest gland of the body, its office being to secrete the bile.

Lobe—A round projecting part of an organ.

Local—Confined to a certain part or district.

Lotion—A fluid applied externally, usually by means of a cloth kept constantly wet therewith.

- Lubricate*—To moisten, as the lubrication of the joints and moving parts by their appropriate fluids.
- Lumbago*—Rheumatism of the lumbar region.
- Lymph*—A transparent and nearly colorless fluid. The fluid contained in, and poured out by, the lymphatics.
- Lymphatics*—The vessels of animal bodies which contain the lymph.
- Macerate*—Steeped almost to solution. Thorough soaking of a part in water previous to dissection.
- Malady*—Disease or ailment.
- Malar*—Pertaining to the cheek-bone.
- Malanders*—An ulcerous condition on the inside of a horse's legs.
- Malaria*—Infectious and noxious effluvia, from decomposing animal or vegetable matter.
- Malformation*—Badly or unnaturally shaped or formed.
- Malignant*—Severe; long; dangerous disease.
- Mammal*—Having an udder or teats for suckling the young.
- Mammary glands*—The glands which secrete the milk.
- Mange*—A contagious disease caused by the presence of acari in the skin.
- Marrow*—The fatty substance in the hollow of cylindrical bones.
- Mastication*—The act of chewing the food.
- Materia medica*—A term including all medicines or substances used in the cure of diseases.
- Maxilla*—The upper or lower jaw.
- Mediastinum*—The partition formed by the meeting of the pleura, dividing the chest into two lateral parts, and separating the lungs.
- Medullary*—Consisting of, resembling, or pertaining to, marrow.
- Membrane*—A thin animal tissue. The thin covering of the brain, bones and other organs.
- Mental*—Relating to the mind, or to the reasoning faculty.
- Mesentery*—The membrane which attaches the intestines to the spine.
- Mesacolon*—A process of the peritoneum to which the colon is attached.
- Metastasis*—The transference or removal of disease from one part to another, or such change as is succeeded by a solution.
- Miasma*—Impalpable germs, the product of putrefaction (animal or vegetable), producing disease.
- Midriff*—The diaphragm.
- Milk fever*—A fever preceding or accompanying the secretion of milk.
- Morbid*—A state of disease; the product or result of an unnatural state, as morbid humors; a failing, sinking state.
- Mortification*—The death of a part from gangrene.
- Motor*—That which causes, or is the instrument of, movement; as, the motor muscles.

Mucilage—A jelly-like fluid; one of the proximate elements of vegetables, abundant in slippery elm; the agent which lubricates the joints.

Mucus—The substance secreted by the mucous membranes, and effused upon the surfaces of the membranes, as the running of the nose in a cold.

Muscles—The organs of motion. The voluntary muscles constitute the lean meat, or flesh of animals.

Muscular fiber—Fibers composing the body of a muscle, disposed in distinct bundles.

Myeline—The fatty substance in nerve tissues.

Myitis myosotis—Inflammation of a muscle.

Myology—The branch of anatomy treating of the muscles.

Myotomy—Dissection of the muscles.

Navus—A natural mark or blemish; a birth-mark.

Narcoma—Stupor from the influence of opium or other narcotic.

Narcotics—Drugs which allay pain and produce sleep.

Nasal—Pertaining to the nose.

Naturalia—The parts of generation.

Nauseants—Medicines that sicken the stomach.

Navel—The umbilicus.

Necrosis—Death of a bone, or of a portion of bone.

Nephritis—Inflammation of the kidneys.

Nerves—The fibrous system which conveys sensations to the brain and through the body.

Nervous—Having weak nerves.

Neuralgia—A painful disease, or affection of, one or some of the nerves.

Neurotomy—The cutting or division of a nerve.

Neutralize—To destroy the force or effect of anything.

Nictitation—A quick and frequent winking of the eyelids.

Nitrate of silver—Lunar caustic.

Nutritive—Tending to nourish or build up; strong, healthy food.

Nutrition—The process by which the food taken is assimilated; to repair waste and promote growth.

Obesity—Exceeding fatness.

Oblique—Slanting.

Obliteration—Alteration in the appearance or function of a part preventing its action.

Occult—Hidden. Applied to diseases whose causes or successful treatment are not understood.

Ocular, oculary—Relating to the eyes.

Odontalgia—Violent toothache, usually from decay.

Oedema—Effusion of serous fluid into the cellular tissues, producing swelling.

Oil—Fluid fatty or unctuous substances, either animal or vegetable.

Oils are either fixed or volatile; the former leave a greasy stain on paper.

Omentum.—The caul. A fold of the peritoneal membrane, covering the intestines in front, and attached to the stomach.

Omnivorous—Animals which eat all kinds of food. Swine are omnivorous, in the general acceptance of the term.

Opacity—Want of transparency; that quality of bodies by virtue of which they cannot transmit rays of light.

Optic—Relating to the sight, as the optic nerve; relating to the laws of vision.

Orbit—In ocular anatomy, the bony cavity in which the eye is situated.

Organ—The natural instrument by which a process or function is carried on.

Organic—Composed of, or pertaining to, an organ or its functions; dependent on, or resulting from, organism.

Orifice—The mouth or entrance to any cavity of the body.

Origin—The beginning or starting point of a thing.

Os—The technical name for bone.

Os calcis—The tip of the back.

Osseous—Bony, or resembling bone.

Os cheocele—Scrotal hernia. Any tumor of the hernia.

Ossification—Changing to bone. Bony formation.

Ostalgia—Pain in one or some of the bones.

Osteo sarcoma—A fleshy, cartilaginous mass, growing within a bone, enlarging and sometimes fracturing it.

Ovariectomy—The art or operation of removing the ovaries from the female animal; spaying—analogue to the gelding of the male.

Ovaries—The organs connected with the uterus that mature and give off the ova (eggs) which, when impregnated, produce the fœtus.

Ovule—The impregnated germ or egg.

Oxidize—The change formed by the action of oxygen, or air containing oxygen, on any substance. The changing of the black or venous blood into red or arterial blood, in the lungs.

Ozoena—Gleet, catarrh.

Pabulum—That which is proper for food.

Palate—The roof of the mouth.

Palpitation—A rapid, thumping movement of the heart, from mental excitement or from disease.

Panacea—A supposed universal cure. A medicine applicable to many cases.

Pancreas—The narrow, flat gland extending across the abdomen, sometimes called the sweet-bread.

Paralysis—An affection impairing or destroying the natural function, and especially the voluntary movement, of a part; in popular usage, the palsy.

Parotid—Near the ear. Parotid gland: the largest of the salivary glands.

Paroxysm—In disease, a recurrence coming on after an intermission.

Chills and fever, for example, are paroxysmal.

Parturition—The act of bringing forth young.

Patella—The knee-pan.

Pathology—The science which treats of the causes, nature, symptoms and cure of diseases.

Paunch—The first stomach of ruminating animals.

Pectoral—Pertaining to the breast, as the pectoral muscles. A medicine adapted to relieve affections of the chest and lungs.

Pectin—The gelatinizing principle of certain fruits and vegetables.

Pelvis—That part of the trunk bounding the abdomen, containing a part of the intestines, and the internal urinary and genital organs.

Penis—The exterior male organ of urination, and of the passage of the semen.

Pepsin—A substance assisting digestion.

Peptic—Promoting digestion; relating to digestion.

Pericarditis—Inflammation of the pericardium.

Pericardium—The serous membrane enclosing the heart.

Perichondrium—The membrane covering the cartilages.

Pericranium—The membrane lining the bones of the skull.

Perinæum—The space between the anus and the genital organs.

Periosteum—The fibrous membrane investing a bone.

Peritoneum—The serous membrane lining the cavity of the abdomen.

Peritonitis—Inflammation of the peritoneum.

Permeate—To penetrate every part of, and pass through without rupture or sensible displacement. Water permeates sand; light permeates glass.

Pharynx—The opening or tube at the back part of the mouth which leads to the stomach.

Phlebitis—Inflammation of a vein.

Phlebotomy—The operation or act of bleeding.

Phthisis—Consumption.

Physiology—The science which treats of the functions of the various organs of a living body.

- Piles*—A disease consisting of chronic dilatation or small tumors of the blood-vessels immediately about the anus, and attended with more or less pain.
- Placenta*—The membrane covering the young in the womb; the after-birth.
- Plethora*—A full habit of body; full of blood.
- Pleura*—The serous membrane lining the interior of the chest, and covering the lungs, which it lubricates with its secretions.
- Plexus*—Any union of vessels, nerves or fibers in the form of net work.
- Pneumonia*—Inflammation of the lungs.
- Poison*—Any substance, animal, vegetable or mineral, which applied externally or taken internally, causes either death or serious hurtful changes. Poisons are classified as irritant, narcotic, sedative, acro-narcotic, and acro-sedative.
- Poll-evil*—A chronic, suppurating abscess, on the summit of a horse's head, around the attachments of the cervical ligaments.
- Polypus*—A tumor with narrow base, in the nostrils, uterus, vagina, etc.
- Post-mortem*—Literally, after death. The examination of a dead body.
- Predisposed*—Prepared or fitted for beforehand; inclined to; as, being predisposed to disease.
- Prepuce*—The cutaneous fold covering the glans penis.
- Probang*—A flexible, knobbed instrument, for pressing into the stomach food or other substance which may have lodged in the throat.
- Process*—Prominence; a projecting part; any protuberance, eminence or projecting bone.
- Profuse*—Abundant, plentiful; as, a profuse discharge.
- Prognosis*—The act or art of judging by the symptoms the probable course of a disease.
- Prolapsus uteri*—Falling of the womb.
- Prolapsus recti*—Falling of the rectum.
- Proud flesh*—A fungous growth on an ulcer, or an excrescence of flesh in a wound from excessive granulation.
- Pulmonary*—Pertaining to, or affecting, the lungs.
- Pulsation*—A beating or throbbing of the heart or arteries.
- Pulse*—The action or beat of the arteries.
- Pumices*—The letting down or falling of the coffin bone on the sole.
- Puncture*—Any orifice made with a pointed instrument.
- Pupil*—The ball or apple of the eye, through which the rays of light pass to the crystalline humors.
- Purgative*—Any medicine having the power of operating strongly on the bowels.

- Pus*—The matter discharged from a tumor when lanced, or from sores.
 Healthy pus is yellowish white in color, and is always secreted in the process of healing.
- Putrefaction*—The process of decomposition; state of corruption; rottenness.
- Pylorus*—The lower orifice of the stomach on its right side, through which the food passes to the intestines.
- Quack*—A pretender in medicine. A charlatan.
- Qualmish*—Sick at the stomach; suffering from nausea.
- Quiescent*—At rest. Showing no pain. Making no sound.
- Quittor*—An ulcerous formation, resembling fistula, inside a horse's foot.
- Rabies*—Madness; hydrophobia.
- Rachitis*—Inflammation of the spine; rickets. The latter word is probably a corruption of rachitis.
- Ramify*—Branched; running in various directions.
- Rancid*—Having a rank, strong smell; in a state of incipient putrefaction.
- Raphe*—A seam or suture.
- Rash*—An eruption of the skin.
- Receptacle*—That which receives or contains something else.
- Rectum*—The last intestine. The anal gut.
- Reflux*—In medicine, the return of the blood from the head, or from towards the extremities to the heart.
- Refrigerants*—Medicines or lotions to diminish heat.
- Regurgitate*—To throw or pour back; to swallow again.
- Relax*—To abate; to become more mild, or less rigorous.
- Remittent*—Ceasing for a time, as a fever or a pain.
- Reproduction*—The act or process of reproducing the young; breeding.
- Resolvent*—A substance or medicine that will scatter inflammatory or other tumors, and prevent their suppuration.
- Respiration*—The act of breathing.
- Respiratory murmur*—The murmur which, when the ear or stethoscope is applied to the chest, is heard in the lungs, and attending the act of breathing.
- Retention*—A stopping or withholding, as retention of the urine.
- Retina*—The expansion of the optic nerve in the back part of the eye, on which the image is produced, in the act of seeing, or vision.
- Repulsion*—In physics, that power by which particles or bodies are made to recede from each other.
- Reunion*—The union of parts separated by a wound or accident.
- Rickets*—A certain diseased state of the bones in children.
- Rigidity*—Stiffness; inflexibility.

- Ringbone*—Exostosis, or formation of bony matter, on the coronet bone and pastern bone of a horse's foot.
- Roaring*—A disease or constriction of the wind-pipe, producing a roaring noise in the expulsion of the breath.
- Rumination*—The act or habit of chewing the cud.
- Rupture*—The act of breaking or bursting, or the state resulting therefrom. The common name for hernia.
- Saccharine*—Containing, or having the qualities of, sugar.
- Sacral*—Belonging to the *os sacrum*.
- Saline*—Containing salt in solution; tasting saltish.
- Saliva*—The secretion of the salivary glands, which moistens the food in chewing, and also keeps the mouth and tongue moist.
- Salivation*—An excessive secretion of saliva. White clover will sometimes produce it in horses, or it may be produced by certain medicines, especially calomel.
- Sanguine*—Full of blood. Abounding with blood.
- Sanguinification*—The process of producing blood from chyle.
- Sanitary*—Relating to the preservation of health; tending to health.
- Sarcoma*—A fleshy tumor.
- Saturate*—To soak so full of liquid or fumes that no more can be held.
- Scab*—The incrustation on a sore. A verminous disease of sheep.
- Scaphoid*—Shaped like a boat, as the navicular bone.
- Scapula*—The shoulder-blade.
- Sclerotic*—The thick, hard, white outer coat of the eye.
- Sciatica*—A rheumatic or neuralgic affection of the hip.
- Sear*—To burn with a hot iron; actual cautery.
- Secretion*—The separation of various substances from the blood.
- Sedatives*—Soothing medicines; remedies to depress nervous power, or lower circulation.
- Semen*—The male generative product secreted in the testicles.
- Senile*—Old, or belonging to old age.
- Sensorium*—The seat of sensation. An organ which receives impressions.
- Sensitive*—Having feeling. Sensitive lamellæ: lamellæ of the coffin-bone.
- Septic*—Causing or hastening putrefaction. Antiseptic: arresting putrefaction.
- Serum*—The yellowish, watery portion of the blood remaining after coagulation.
- Seton*—An artificial passage made under the skin, by means of a seton needle, and kept open with tape, silk or the like, which is thereby drawn in, and is moved backward and forward daily, to keep up irritation, with a view to reducing inflammation elsewhere.
- Shank*—The bone of the leg from the knee to the ankle.

Sialogogue—A medicine to promote the flow of saliva.

Sinus—An orifice or canal containing pus or matter.

Skin—The covering of the body, and the organ of touch. It is composed of the scarf skin (*cuticle*), the middle (*retia mucosum*), and the inner or true skin (*derma*).

Slink—To abort; to produce young before the natural time.

Slough (pronounced sluff).—To fall away, separate from, as in disease, or in mortified parts.

Socket—The depression or process in which one organ works on another.

Soporific—A medicine to induce sleep.

Spasm—A sudden involuntary contraction of the muscles; a convulsion.

Spasmodic—Characterized by spasms, as cramping, fits, etc.; recurring at intervals, as colic pains, etc.

Spavin—A swelling in or near some of the joints of a horse's leg. It is of two kinds. Bone spavin is a bony growth (*exostosis*) in the region of the hock. Bog spavin, incorrectly called blood spavin, is situated between the tibia and astragalus.

Spinal—Relating to the spine, or back-bone.

Splint—An excrescence in the shank-bone of a horse. Splint-bone: one of the bones of a horse's leg.

Spleen—A livid colored organ, the office of which is not yet well known.

Spontaneous—Occurring without any apparent cause from without.

Sporadic—Separated, scattered; occurring here and there, as sporadic cases of disease.

Sterile—Barren. Not capable of producing young.

Sternum—The breast-bone, situated in the fore part of the thorax.

Stimulants—Medicines to temporarily excite the nervous or circulatory systems.

Stomachics—Agents to promote digestion.

Strangles—An eruptive fever attended with inflammation and suppuration of the tissue of the upper part of the throat; called in the United States, distemper.

Strangulated—Choked; having the circulation stopped in any part.

Strangury—Stopping of a passage.

Stricture—Stoppage or obstruction of a passage of the body, by morbid or spasmodic action.

Stupor—A dull, sleepy, stupid condition. Loss of sensation.

Styptic—A powerful astringent for restraining or stopping bleeding.

Sudorific—That which will cause perspiration or sweating.

Suppuration—The process of forming pus or matter; the result of inflammation in an abscess or wound.

- Suture*—A stitch or fastening on joining together. The seam or joint which unites the bones of the skull.
- Symmetry*—As applied to animals, signifies that they are well proportioned, handsomely and stoutly formed.
- Sympathy*—The connection existing between two or more organs, by which the diseased condition or abnormal action of one is transmitted, secondarily, to the others.
- Symptom*—Any circumstance observed to occur constantly in the same form of disease, and serving to point out its true nature and seats; any change occurring in the progress of a disease, indicative of its course and probable determination.
- Synovia*—A fluid resembling the white of an egg, secreted at the joints and articulations, which it lubricates and keeps in healthful condition.
- Joint-oil*, so called.
- Tenìa*—Literally, fillet or band. The scientific name of the tape-worm.
- Tarsus*—The cartilage towards the edge of each eyelid, giving it shape and firmness. That part of the human foot with which the leg joins, and whose front is called the instep. The hock-joint of the horse.
- Tendon*—The dense, fibrous structure in which a muscle ends, and by which it is joined to a bone.
- Tent*—A pledget or plug introduced into a wound.
- Tenuity*—The property of being thin, as rarefied air.
- Testicle*—The male gland containing the seminal fluid.
- Tetanus*—A disease in which the muscles of voluntary motion are spasmodically but persistently contracted, causing rigidity of the parts affected. When in the face it is called lock-jaw or trismus.
- Therapeutics*—That part of medicine which relates to the discovery and application of remedies for diseases. The use of diet and medicines.
- Thorax*—The chest, or that part of the body between the neck and abdomen.
- Thorough-pin*—A bursal enlargement of the upper and back part of the hock of a horse.
- Thrush*—Ulceration of the cleft of the frog, and extending over the whole of it, with a discharge of fetid matter.
- Tibia*—The large bone of the hind leg of the horse, etc.
- Tonics*—Agents which gradually and permanently improve the system.
- Tonsil*—An oblong gland situated on each side of the fauces, terminated by the larynx and pharynx, at the rear of the mouth and having excretory ducts opening into the mouth.
- Torsion*—The act of turning or twisting, as in drawing a tooth with the turnkey.
- Trachea*—The windpipe.

Tractile—That which may be drawn out.

Transfusion—The introducing of blood from one living being into another.

Tread—Trampling upon, as the tread of one hoof upon the other. The part of the hoof resting on the ground.

Trichina spiralis—A minute entozoön (parasitic mite), which burrows in the muscles, and which, before becoming encysted, sometimes causes the death of the animal. They are principally generated in swine, fowls, rats and other omnivorous feeders.

Tuber—A rounded projection, especially of a bone.

Tubercle—A small tumor, as tubercles in the lungs.

Tumor—A swelling or enlargement, generally applied to those which are permanent.

Tympanum—The drum of the ear.

Ulcer—A running sore.

Ulna—The larger of the two bones of the arm.

Ultior—Remoter; yet to come; last or final.

Umbilicus—The navel.

Ungulata—Animals having the toes (digits) enclosed in hoofs.

Unciform—Curved or crooked, as a clam or the finger nail.

Ureter—One of the two canals or ducts which convey the urine from the kidneys to the bladder.

Urea—The principal characteristic constituent of urine. It is white, transparent and crystallizable.

Urinary—Pertaining to the urine.

Urine—The saline secretion of the kidneys.

Uterus—The womb.

Vagina—The canal, in female animals, from the vulva to the uterus.

Varicose veins—Veins, most commonly in the legs, which are permanently dilated, knotted and irregular.

Vascular—Pertaining to the vessels of animal and vegetable bodies, as the vascular functions. The arteries, veins, lacteals, and the like, compose the vascular system. Animal flesh is vascular.

Venesection—Letting blood by opening a vein.

Venous—Pertaining to the veins, or contained in the vein.

Ventral—Pertaining to the abdomen or belly.

Ventricose—A swelled appearance, making the object look bellied.

Vermicular—Worm-like in shape or appearance.

Vermifuge—A medicine or agent to kill or expel worms.

Vertebra—A division or separate bone of the spinal column.

Vertex—The top of the head

Vertigo—Dizziness. An indication of plethora, or, frequently, a symptom of some disease.

Vesicle—A small blister. Any membranous cavity.

Veterinarian—One skilled in (and, usually, legally qualified for) the treatment of the diseases of the horse, cattle and other domestic animals.

Veterinary—Pertaining to the diseases of domestic animals, and treatment of the same; connected with the duties or art of the veterinarian.

Villi—Fine, small fibres. Villous: abounding with minute fibres, as the inner mucous membrane of the stomach and intestines, called the villous coat, from its abounding with villi or minute hairs.

Virulent—Dangerous or malignant; as, a virulent type of a disease.

Virus—Contagious or infectious matter.

Viscera—The organs contained in any cavity of the body, particularly of the head, thorax and abdomen.

Viscid—Sticky or tenacious, with a glutinous consistency.

Vision—The act or faculty of seeing; that which is seen.

Vital—Having or containing life. Necessary to life.

Vivify—To bring to a vital state.

Vivisection—The dissection of, or cutting into, living animals.

Volatile—Giving off vapor, or flying off in vapor.

Vulnery—Plants, lotions, ointments, drugs or other substances useful in the healing of wounds.

Vulva—The outer opening in female animals, of the generative parts.

Wane—To decrease, as in a fever.

Warbles—Small, hard tumors on the back of a horse, from irritation of the saddle. Tumors occasioned by the depositing of the eggs of the gadfly in the backs of horses and cattle.

Warts—Spongy excrescences on various parts of the body.

Wen—A distinctly defined tumor under the skin, seldom hurtful. An encysted tumor.

Whinny—To utter the call of the horse. To neigh.

Windgalls—A distension of the synovial membranes of a horse's fetlock joints.

Withers—The bony crest of the shoulders, in a horse.

Womb—The uterus, or bag in which the young are carried before birth.

Wound—A breach of the skin or flesh. Surgery classifies wounds as confused, incised, punctured or poisoned.

Wry neck—An involuntary fixed position of the head towards one of the shoulders.

Xiphoid—Sword-like. A small cartilage at the bottom of the breast-bone.

Yeasty—Frothy, foamy, spummy; as, yeasty pus or matter.

Zeine—The gluten of maize.

Zoölogy—That part of natural history which treats of the structure, habits, classification and habitations of animals.

Zoön—An animal ; having animal life.

Zoötoomy—Dissection of the lower animal

Zygoma—The cheek-bone.

Zygomatic—Pertaining to the cheek-bone, or to the bony arch under which the temporal muscle passes.

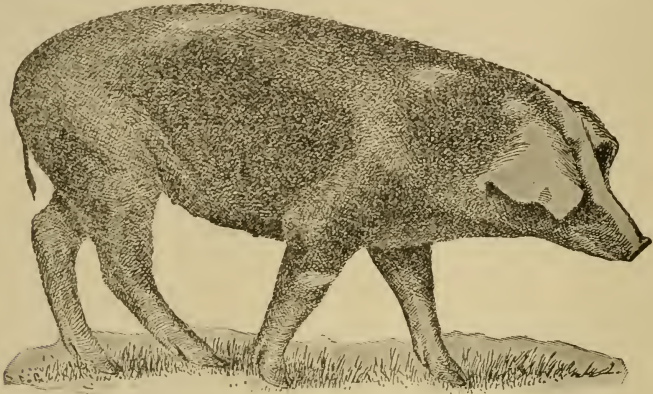
Zymotic—Caused by, or pertaining to, fermentation ; as, a zymotic disease, being one in which some morbid principle acts on the system like a ferment.

BOOK VII

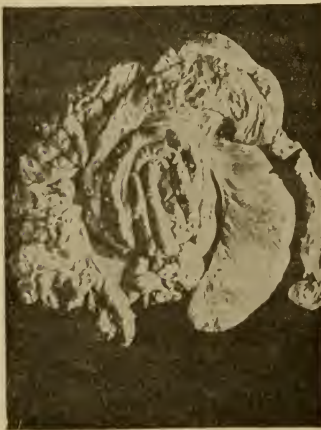
SUPPLEMENTARY

INCLUDING CANADIAN, AFRICAN,
AUSTRALIAN AND OTHER
MATTER

Stomach.—The stomach is the large white pouch-like organ which is situated in the upper part of the abdominal cavity next to the lungs and by the side of and partly underneath the liver. Usually the external surface of the stomach shows no change from normal, though occasionally there may be observed small red spots similar to those which have been described as appearing in the lungs, heart, and kidneys. The stomach should be opened by cutting the front wall from one end to the other.



HOG SICK OF HOG CHOLERA, CHRONIC TYPE.



INTESTINES OF A HOG.
Notice the small tubercles.

Small intestine.—In some acute and virulent types of hog cholera the outer surface of the small intestine may be literally covered with bloody spots, giving one the impression that blood had been spattered over these organs, but upon washing them with water it will be found that these bloody areas can not be removed. There is no other characteristic lesion of the outer surface of the small intestine. The inner lining, however, may at times, in cases of hog cholera, be congested and inflamed, so that the normal wrinkled inner surface is greatly thickened and covered with a yellowish exudate or coating, or it may be dotted with small bloody spots like those seen on the outer surface.

"HOG CHOLERA."

FROM THE LATEST EXPERIMENTS AND INVESTIGATIONS.

- I. THE VARIOUS FORMS ASSUMED.—II. INVESTIGATIONS IN SWINE PLAGUE.—
III. CONTAGIOUS, OR INFECTIOUS PRINCIPLE, ETC.—IV. FROST AND THE
VIRUS.—V. MEASURES OF PREVENTIVE.—VI. THE DISEASE AS OBSERVED
IN SWINE.—VII. GLOSSARY OF PRECEDING SCIENTIFIC TERMS.—VIII. CON-
CLUSION.

In the body of this work the various contagious diseases of swine are treated of. Malignant diarrhœa often carries away large numbers of swine. It is sometimes called hog cholera. In a general way corn burned nearly to a charcoal is a good corrective of diarrhœa. So is wood charcoal, and also the slack of bituminous coal, or the soft coal itself. Fatal diarrhœa is often the result of disorganization of the functions of the liver, the flux not being the disease, but the result. To excite the liver to action where this is suspected, for a hog weighing from a hundred to a hundred and fifty pounds in ordinary stock condition, give 20 grains powdered mandrake, or from 10 to 20 grains of calomel, and repeat if necessary. This will excite the liver to action.

In the first stages of diarrhœa, where the discharges are copious and dark, give 1 to 2 drachms of bi-carbonate of soda dissolved in milk, or if the hog will eat, incorporate it in a warm bran mash. The liver remedy may also be given in the same way.

In cases of cholera, if subsequent to the flux constipation ensues, it may be met with doses of 1 ounce of castor oil and 1 drachm of turpentine. Or give one-half ounce doses of sulphate of soda in one-half pint of water.

If there is difficult breathing and cough, give 1 to 2 grains of tartar emetic and one-half drachm of saltpetre, two or three times a day, in one-half pint of water, and rub the sides of the chest and throat with turpentine.

In giving these formulæ the farmer must use his judgment. Follow up the doses as may be required to produce the effect desired. These remedies will also be indicated in cases of malignant hog cholera.

I. The Various Forms Assumed.

When the later symptoms are pronounced, the disease will assume the form of malignant epizootic catarrh, (see page 984), and the prescriptions there given are to meet the symptoms as stated.

On page 985 a form of intestinal hog cholera is treated of under the name of "Contagious Fever of Swine." Symptoms as there stated should be closely observed, that they may be met by the remedies as stated.

Still another form of hog cholera, and one of the most malignant and fatal, is a peculiar inflammation of the lungs and bowels, known as contagious pneumo-enteritis. This is the disease that has caused such wide destruction of swine, and which the government of the United States has spent long time of the best veterinary talent of the country and money to investigate. The result of all this is, that hogs once fairly down with any of the fatal forms of contagious diseases we have mentioned, had better be killed at once, and sent to the grease rendering tank if near, or deeply buried. When a hog is too sick to take medicine in food, the difficulty of administering is one of the chief obstacles to produce the proper effect.

DISINFECTION.—The rules for disinfection must be carefully observed, as given on pages 989 and 990, for where the virus germs are present or capable of being brought, there can be no hope of permanent help. There is no specific for these malignant diseases, as already stated in this book. The cures claimed from the use of so-called specifics are of swine not affected with malignant diseases; as preventives they may be valuable. Fully as much or more so, will be No. 8 and No. 12. The receipts given in the descriptions of the several forms of hog cholera are the best known to veterinary science.

II. Investigations in Swine Plague.

Recognizing the importance of combatting the virulent contagious diseases affecting swine, the Department of Agriculture, at Washington, has had competent veterinarians investigating the disease for years. A large portion of the work, and especially the microscopical examinations, were placed under the direction of H. J. Detmers, V. S., now professor of veterinary science, University of Ohio. This gentleman adds to his accurate knowledge as practitioner the habit of careful investigation in various departments of science. His examinations into swine plague (hog cholera) covers a number of years, and we give his general statement of symptoms, and, also, general conclusions gathered from the hundreds of pages he has written on the subject.

III. Contagious, or Infectious Principle, Etc.

If an animal infected with swine plague receives a wound or an external lesion sufficient to cause congestion and inflammation, the morbid process is almost sure to localize in the congested or inflamed parts. Further, if the infectious principle is introduced into the wound or a

lesion with inflamed, swelled, or congested borders—for instance, in a wound caused by ringing or castration, etc.—the morbid process is sure to develop in the inflamed or congested borders of that wound. All this is easily accounted for if the *bacilli* and their germs constitute the infectious principle, and if the mode and manner in which they obstruct and clog the capillary vessels is taken into consideration; but it is utterly irreconcilable with the non-appearance of any local reaction after an inoculation by means of a wound too slight to cause congestion, if the infectious principle possesses the nature of a virus, or of a chemical agency.

IV. Frost and the Virus.

Swine plague, until the last days of December, or until the ground becomes covered with snow, and the weather exceedingly cold, was spreading from farm to farm and from place to place, in the locality visited, but as soon as the temperature began to remain below the freezing point at noon as well as at night, it at once ceased to spread from one farm or locality to another. At the same time, however, it was observed that the very cold weather of the last days of December and the first days of January did not materially interfere with the spreading of the swine plague from one animal to another in all pens and hog lots in which the disease had previously made its appearance, and in which the way of feeding and watering the animals was such as to allow a contamination of the food and the water for drinking with the excreta of the diseased hog, or in which the pigs and hogs still healthy had open wounds, sores, or scratches, and had to sleep together with the diseased hog in the same place and on the same litter. Afterwards, when milder weather had set in, the spreading from one place to another very slowly commenced again. (The cold indicated 20 degrees below zero.)

V. Measures of Preventive.

In relation to the spread of the disease and measures for prevention, Dr. Detmers advises as follows:

The most effective means of prevention that can be applied by the individual owners of swine consists, first, in promptly destroying and burying sufficiently deep and out of the way the first animal or animals that show symptoms of swine plague, if the disease is just making its appearance, and in disinfecting the premises, or if that is difficult, in removing the herd at once to a non-infected place, or out of the reach of the infectious principle. If possible the herd should be taken to a piece of high and dry ground, free from any straw and rubbish—if recently plowed, still better—and should there receive clean food and no water except such as is freshly drawn from a well. If this is complied with, and if all com-

munication whatever with any diseased hogs or pigs is cut off in every respect, which is absolutely necessary, and still danger should be anticipated, for instance, if one or more animals should have become infected before the herd was removed, or a possibility of either food or water for drinking being or becoming tainted with the infectious principle should exist, the danger may be averted, or at least be very much diminished by administering three times a day to the water for drinking either some carbolic acid (about 10 drops each time for every 150 pounds of live weight) or some hyposulphite of soda (a teaspoonful for every 100 pounds of live-weight), till all danger has disappeared. Second, where swine plague has been allowed to make some progress in the herd, or where the presence of the disease is not discovered until several animals have been taken sick or have died, and others have become infected, the best that can be done is to separate at once the healthy animals from the diseased and suspected ones; to place the healthy animals by themselves and the doubtful ones by themselves; to separate, disinfect and treat the animals in the way just stated. Special care must be taken to prevent any communication, direct or indirect, between the three different parts of the herd. If one person has to do the feeding, etc., he must make it a strict rule to attend always first, to the healthy animals, then to those considered as doubtful, and last to the sick ones, and must never reverse that rule, or go among the healthy hogs or pigs after he has been in the yard or pen occupied by the others. If possible each portion of the herd should have its own attendant, who should not come in contact with any of the others. The separation must be a strict one in every respect; even dogs and other animals may carry the infectious principle from the diseased animals or from the yard occupied by them to the healthy hogs and pigs. Buckets, pails, etc., which are used in feeding the sick hogs should not be used for the healthy ones, because the infectious principle may be conveyed by them from one place to another. Last, but not least, it is very essential that the hog-lot occupied by the healthy portion of the herd be higher than that occupied by the others. If it is lower, and especially if it is so situated that water and other liquids from the other hog-lots can flow into it or over it, the separation is worse than useless, for then the healthy portion of the herd will surely become infected, unless the ground is exceedingly dry. Third, whenever swine plague is prevailing in the neighborhood, any operation, such as ringing, marking by wounding, or cutting ears or tail, and castration and spaying particularly, must not be performed, but should be delayed until the disease has disappeared, or does not exist anywhere within a radius of two miles. If such operation should become absolutely necessary, the

wounds must be dressed at least once a day with an effective disinfectant, for instance, with a solution of carbolic acid or thymol, till a healing has been effected. (See disinfectants, page 990.)

Swine plague is very often communicated from herd to herd and from place to place by a careless, and, in some cases, even criminal contamination of running streamlets, creeks and rivers with the excrements and other excretions of diseased hogs and pigs, and with the carcasses and parts of the carcasses of the dead animals. This source of the spreading of the disease can be stopped only by declaring such contamination of streamlets a nuisance and making the offense punishable by law. Allowing swine affected with the plague to have access to such streamlets should be considered as constituting good evidence of such a contamination, as also the throwing of dead hogs, or parts of a carcass, into such streamlets, creeks, or rivers.

VI. The Disease as Observed in Swine.

Symptoms during life.—"The disease may last from a few hours to four weeks in fatal cases. Quite frequently animals will die very suddenly and without warning. Some of these cases present the hemorrhagic type of the disease very distinctly. In the majority of cases which came under our observation recently, the disease lasted from one to two weeks. The most prominent symptoms are those of great debility and capricious appetite. In about one-half of the cases, diarrhœa set in after three or four days. The feces are usually liquid, at times blood-stained. In those cases where ulceration is extensive, diarrhœa is always present. The rectal temperature is usually high but variable, and not at all reliable as a means of determining the intensity of the disease.

Lesions observed after death.—Discoloration or reddening of the skin is quite rare. When present, it is usually found about the genitals in both sexes. The subcutaneous fatty tissue is frequently of a diffuse redness and rarely studded with small extravasations.

The peritoneal cavity usually contains more or less straw colored serum in advanced cases. In those which die quite suddenly serous effusions are absent. The coils of the intestine are now and then covered with a few fibrinous, stringy coagula, indicating slight peritonitis. Beneath the serous covering of the intestines extravasations of blood are quite common in very acute cases. They are most frequently encountered on the large intestine throughout its entire length or limited to the cæcum. Occasionally a few coils of the ilium are covered with punctiform ecchymoses. They are found now and then on the stomach. Only once did we see large ecchymoses in the fatty tissue surrounding the kidney.

The spleen is usually considerably swollen, dark, gorged with blood,

and very friable. On its surface and borders, in acute cases, raised blood-red points are frequently encountered. The liver is sometimes enlarged, sometimes highly congested, and is found quite pale at other times. Occasionally its surface is mottled with pale greenish patches. The kidneys are more or less changed. Frequently the surface is dotted with a variable number of dark-red points, is commonly much congested; even the tips of the papillæ may assume a dusky hue. The cortical portion in some cases is the seat of a hemorrhagic inflammation. On section it is dotted with closely set, dark-red points, probably the glomeruli in a state of extreme engorgement.

The heart is but slightly affected. The pericardium is always more or less distended with fluid. In acute cases a variable number of punctiform and larger extravasations are present beneath the pericardium of the auricular appendages. More rarely a few are found beneath the endocardium of the ventricles. The right side is, as a rule, distended with a dark coagulum and left nearly empty.

The lungs are in many cases normal, both in cases of rapid death and protracted disease. We have seen many cases in which perfectly sound lungs accompanied extensively ulcerated intestines. In a moderate number of acute, virulent cases, the lungs are, in general, collapsed and pale. Under the pleura, however, there are seen small patches of a dark-red color, which correspond to limited regions of dark hepatized tissue not much more than one-quarter inch in diameter. These foci are always found throughout the lung tissue in greater or less abundance. In the advanced stages of chronic swine plague, the major part of the lungs may be completely hepatized. This condition we have found but rarely, and may depend on circumstances not yet clearly understood.

The lymphatic glands are always more or less affected, those of the thorax as well as those of the abdomen. The glands at the root of the mesentery are very much thickened and confluent, mottled, red, and whitish; the medullary portion is commonly reddened, the cortex more frequently gorged with blood. The glands imbedded between the coils of the large intestine are usually of a very dark-red. When these coils are torn apart, the glands are brought to view as isolated, bean-shaped bodies, their dark, blood-red color contrasting markedly with the adjacent paler, flesh-colored serosa. This congestion prevails throughout the gland-tissue. On section the knife becomes covered with blood. This description applies equally well to the glands in the region of the stomach, the paler inguinals, the bronchial, and mediastinal glands. In chronic cases, which have lasted from three to four weeks, the lymphatics are usually large, but very pale and tough on section.

The intestinal tract is ordinarily the seat of the most severe lesions. In the stomach the fundus or most dependent portion is deeply reddened, often blackish in color, depending on the amount of extravasated blood. Occasionally clots of blood are found forming a coating around the food. In older cases the inflammation may be absent or replaced by isolated ulcers. The duodenum is rarely affected. The jejunum seems to enjoy a still greater immunity. The ileum is less exempt from pathological changes which seem to be proportioned to the extent and severity of the lesions found in the adjoining large intestine, which will be first described."

VII. Glossary of Preceding Scientific Terms.

The scientific terms used in the foregoing in diseases as observed in swine, are as follows:—

Auricular—Pertaining to the ear.

Cæcum—The commencement of the large intestine.

Ecchymoses—Livid, black or yellow spots from extravasation or effusion of blood.

Feces—The natural discharges of an animal.

Glomeruli—Heads. Places of gatherings.

Hemorrhagic—Pertaining to flux or discharge of blood.

Hepatized—Gorged with effused matter, producing a peculiar livery appearance.

Ilium—The third or longest division of the lesser intestines.

Lymphatic Glands—A reddish colored gland connected with the lymphatics (*lymphatic*, a vein-like valved vessel containing a transparent fluid).

Lesion—An injury or morbid change.

Mesentary—The membrane which retains the intestines and their appendages in their proper position.

Peritoneal—Region of the thin, smooth serous membrane investing the whole internal surface of the abdomen, and more or less all the viscera contained in it, and of which it forms the surface.

Pericardium—The membranous sac inclosing the heart.

Pleura—The membrane of the inner portion of the thorax and investing the lungs.

Rectal—The last portion of the intestines.

Sub-cutaneous—Under the skin.

VIII. Conclusions.

The preceding investigations definitely settle certain controverted points concerning the causes of swine plague, which may be briefly summarized:

Swine plague is caused by a specific microbe (an invisible germ) multiplying in the body of the diseased animal. The microbe probably belongs to the genus bacterium (a filamentous organism not yet definitely known as belonging to the vegetable or animal kingdom, but apparently having distinct power of motion).

When introduced beneath the skin this bacterium is fatal to pigs, rabbits, guinea-pigs, mice, and a certain percentage of pigeons, it is more than probable that cattle inoculated with the virus of swine plague will come down with a disease that has been mistaken for contagious pleuropneumonia, but it is not communicated to other animals. It is also fatal to pigs when introduced with the food, or when they feed on the internal organs of swine which have died of the disease.

It is worthy to be remembered that the disease described in France as Rouget, and in Germany as Rothlauf, and for which Pasteur has prepared a vaccine, is caused by an entirely different microbe. The vaccine for this disease does not protect against swine plague. The introduction of Pasteur's vaccine is not only useless but may contribute to the introduction and spread of a disease, the existence of which in this country has not yet been demonstrated.

During the last two years, 1897-98, the Bureau of Animal Industry has been experimenting with the serum treatment, both as a cure and preventive, in Pope County, Iowa, with the result that about 23.16 per cent. of infected hogs died, showing a recovery of 76.84 per cent. In a corresponding number of hogs in other herds not treated the loss was 84.24 per cent. This is a remarkably strong showing in favor of the serum treatment. This serum can be got from the Department of Agriculture at Washington, D. C. It can be applied by any up-to-date veterinarian.

The value of this treatment can be figured from the loss in Iowa alone last year of \$15,000,000.

Full particulars of the experiments with this serum are found in Bulletin No. 23, United States Department of Agriculture, Bureau of Animal Industry, 1899.

Hog Cholera (1911):—It is yet the great question among breeders of hogs. It is well established that he who provides comfortable quarters for his hogs, keeps their surroundings clean by a regular program of removal of filth and disinfecting where they eat, sleep and wallow, with a constant lookout for lice and providing for such food as the system requires, need have little fear of that dread disease.

Experts are in hot pursuit of the cholera bacillus and as a result are rapidly perfecting a serum that is an anti-toxine against hog cholera and will no doubt control that disease as effectually as they do black leg in cattle.

SWINE.

By Prof. G. E. Day, B. S. A., Professor of Agriculture and Farm Superintendent, Ontario Agricultural College, Guelph, Ontario.

I. Judging Hogs of Bacon Type.—II. The Fat Hog.—III. Large Yorkshires.—IV. Tamworths.—V. Berkshires.

In dealing with this subject it will be necessary to pay special attention to the type of hog for which Canada is noted, and this calls for some explanations regarding our trade in pork products.

American vs. Canadian Trade.—In the United States there is an immense home market for lard and oleomargarine (a substitute for butter). In Canada we have no trade in oleomargarine, and a very much smaller home market for lard. The American packer, therefore, can utilize very fat hogs, manufacturing lard and oleomargarine from the fat, and placing only the leaner carcasses and the lean parts of the fat carcasses upon the market to be consumed as meat. On the other hand, practically all the Canadian hogs must be consumed as meat, and as there is a very limited and decreasing demand for fat pork, the production of a leaner type of hog has become a necessity. Great Britain is the home of the export trade in pork products of both Canada and the United States, the latter country exporting vastly larger quantities than Canada; and in order to keep out of a hopeless competition with the Americans, our packers have been forced to cater to an entirely different class of customers. Thus it comes that the lean and carefully prepared bacon of Canada is taken by the large cities of Great Britain, while the American product goes to a less fastidious class of customers at a considerably lower price. Canadian bacon, therefore, does not really come into competition with the American product in Great Britain, and a very little consideration of the facts briefly outlined above should convince any thoughtful person of the importance of keeping out of the way of American competition. Our chief competitors are Denmark and Ireland, and the whole future of our swine industry is dependent upon the intelligent attention our Canadian breeders and feeders pay to quality. *Superior quality* must be our motto, if we would hold and extend our trade.

The kind of bacon of which Canadian packers make a specialty is what is known as the "Wiltshire side." To make this bacon, a hog is required weighing from one hundred and sixty pounds to two hundred and twenty pounds, live weight, though hogs are preferred not over two

hundred pounds live weight. The description and scale of points which are offered give a pretty clear idea of the type of animal required, but it may be added that the layer of fat along the back should be only about one and a quarter inches thick, and that it should be uniform in thickness over loin, back, and shoulder top. A hog suitable for making Wiltshire sides is known in Canada as a "bacon hog."

I. Judging Hogs of Bacon Type.

We now come to a very important matter, that of judging swine of bacon type. It is perhaps too much to expect that there will ever be entire unanimity of opinion among judges, yet it is something greatly to be desired, and an effort should be made to come as near to this desired end as possible. The main difficulty in judging seems to arise from the fact that judges differ regarding the relative importance of the various

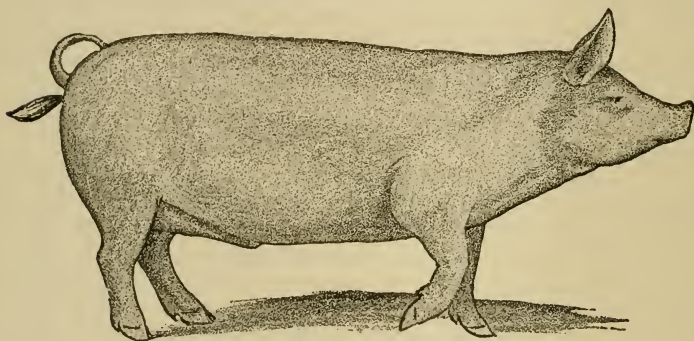


FIG. 1.—Light jowl and good neck; shoulders well proportioned; belly sags a little towards the rear, good length of side.

parts of an animal. They may be in entire accord as to what constitutes a perfect bacon hog, but, unfortunately, perfect animals are scarce, and it is in the attempt to balance one defect against another that differences in judgment frequently occur. It would seem reasonable, therefore, to assume that some authoritative standard of excellence and scale of points would be helpful in bringing about greater uniformity in judging.

In the scale of points given herewith, an attempt has been made to distinguish between a breeding animal and one intended for slaughtering. It is quite apparent that in breeding animals, weight limits should not be used. On the other hand, an animal that is to be slaughtered need not be criticized as to eyes, ears, hair, style, or the strength of its pasterns, while weight becomes very important.

In connection with the scale of points, it will be well to study the diagram (Fig. 3) given below. It has been copied from an article by Loudon M. Douglas, in the Royal Agricultural Society's Report for 1898. Unfortunately, later figures are not available; but the diagram

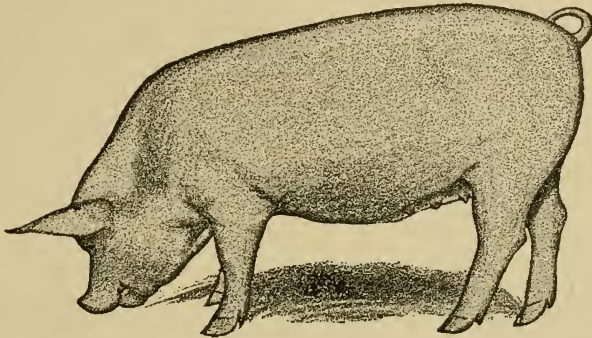


FIG. 2.—Well proportioned shoulder, good top line and good trim belly, but lacks length.

may be regarded as showing, at least approximately, the relative values of the various cuts. Attention is also called to Figures 1 and 2, which are modified sketches made from photographs of two hogs from the experimental department of the Ontario Agricultural College.

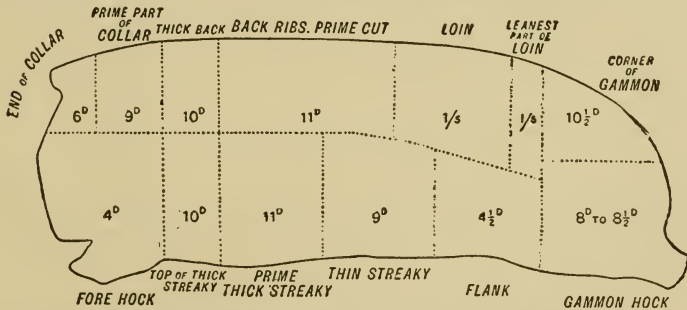


FIG. 3.—Diagram showing various cuts of a side of bacon, and the average prices realized for each during 1897. (Copied from R. A. S. Report for 1898.)

SCALE OF POINTS FOR HOGS OF BACON TYPE.

DESCRIPTION.	POINTS
HEAD AND NECK—8 points:	
Snout, moderately fine.....	1
Eyes, good size, full and bright.....	1
Jowl, light and neat.....	3
Neck, medium length, muscular, but possessing no tendency to arch on top.....	3

FORE QUARTERS—17 points:

<i>Shoulders</i> , light, smooth, rounded from side to side over top and very compact, no wider than back.....	9
<i>Breast</i> , good width and full.....	4
<i>Fore Legs</i> , set well apart, medium length, and straight; pasterns, upright; bone clean and moderately fine.....	4

BODY—40 points:

<i>Back</i> , medium width, rising slightly above the straight line, and forming a very slight arch from neck to tail.....	9
<i>Loin</i> , strong and full but not unduly arched, wide as rest of back....	5
<i>Ribs</i> , good length and moderately arched.....	3
<i>Side</i> , fairly deep; long, smooth, and straight between shoulder and ham; a straight-edge laid over shoulder point and ham should touch the side throughout.....	12
<i>Heart Girth</i> , full but not flabby at fore flanks, filled out even with side of shoulder; there should be no tucked-up appearance back of fore legs, nor droop back of shoulder top.....	5
<i>Flank</i> , full and low.....	1
<i>Underline</i> , straight; the belly should be markedly trim and neat.....	5

HIND QUARTERS—15 points:

<i>Rump</i> , same width as back, long and slightly rounded from a point above hips to tail, and rounded from side to side over top....	5
<i>Ham</i> , full without flabbiness; thigh, tapering towards hock without wrinkles or folds, and carrying flesh well down towards hock.....	6
<i>Hind Legs</i> , medium length; hocks, set well apart but not bowed outward; bone clean, and moderately fine; pasterns, strong.....	4

QUALITY—15 points:

<i>Ear</i> , rather thin, (1); hair, fine and abundant, (2); skin, smooth, showing no tendency to wrinkle, (2); bone, moderately fine and clean in legs, moderately fine in snout and head, and showing no prominence on side and top of shoulder, (5); flesh, firm and smooth, with no flabbiness at jowl, fore flank, belly, or ham, (5).....	15
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STYLE—5 points:

Active and sprightly in movement, walking without a swaying motion, and standing well up on toes.....	5
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Perfection..... 100

N. B.—For hogs intended for killing, the same scale of points may be used with the following modifications: Strike out score fore eyes, ears, hair and style; deduct two points from points allowed fore legs and also hind legs and add following score:

<i>Weight</i> , 175 to 200 pounds, live weight. Being under 160 pounds or over 220 pounds will disqualify.....	13
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Regarding the scale of points, the following may be noted:

Head and Neck.—These parts have very little market value and consequently should be comparatively light. A great deal of the weight of the head is in the jowl, which should therefore be light. A long, scrawny neck is very objectionable, indicating poor feeding qualities. A short neck is a good thing in itself, but where the neck is very short it is apt to be heavy on top, a formation associated with heavy shoulders

carrying a great thickness of fat over the top. Fig. 1 shows a very light jowl and a good neck.

Fore Quarters.—The diagram shows that the values are low in the fore quarters, particularly the fore hock, or shoulder. Consequently, we want as little shoulder as is consistent with constitution, smoothness of shoulder being especially desirable. Figures 1 and 2 show very well-proportioned shoulders, together with a very good representation of the style of legs required.

Body.—A glance at the diagram will show the importance of the body and the desirability of great length. The desired top-line is well illustrated in Fig. 2, though the hog has scarcely enough length. While a "razor back" is not desirable, yet a broad back invariably gives too great a thickness of fat. A flabby, heavy belly, with heavy fore flanks, must not be mistaken for a long rib. A fair depth of side is very desirable; but when it goes beyond a certain point it becomes objectionable, because it gives too much belly meat. Notice in the diagram the prices of "flank" and "thin streaky" as compared with the cuts above them. Fig. 2 shows a good trim belly, but in Fig. 1 it sags a little too much towards the rear, owing to the somewhat crouching position of the animal, which the artist has failed to entirely eliminate. Fig. 1, however, shows an excellent length of side.

Hind Quarters.—Some surprise may be occasioned by the comparatively low value attached to the ham in the diagram. A large, blocky ham is not desirable, but the ham should taper gradually towards the hock, and be very smooth.

Quality.—Special attention should be paid to general smoothness and absence of flabbiness.

Style.—This would, of course, be disregarded by the packer, but is deserving of some prominence in breeding stock.

Before leaving the question of the bacon hog, it is worthy of note that carefully conducted experiments at the Ontario Agricultural College, Guelph, go to show that it does not necessarily cost any more to produce a pound of gain in a good type of bacon hog than in any other type. Hogs of excellent bacon type proved very economical feeders, and ranked very high in this respect when compared with fat types

II. The Fat Hog.

The fat hog, so popular in the United States, is practically the opposite of the bacon hog in general character. Its weight may be anywhere from 200 to 400 pounds, the common run being from 200 to 300 pounds live weight. In this animal, thickness and depth are emphasized rather than length. The heavy jowl; short, thick neck; broad shoulders,

back and rump; heavy and frequently bulging hams; deep, rather than long, side; short legs, and the fine bone which is an indication of obesity rather than muscular development, all combine to make up an animal very different indeed from the bacon type. There is a popular belief that this type of hog can be more cheaply produced than the bacon type. This may be true for certain conditions; but for the conditions which commonly prevail in Canada, the belief is ill-founded, as has been previously stated.

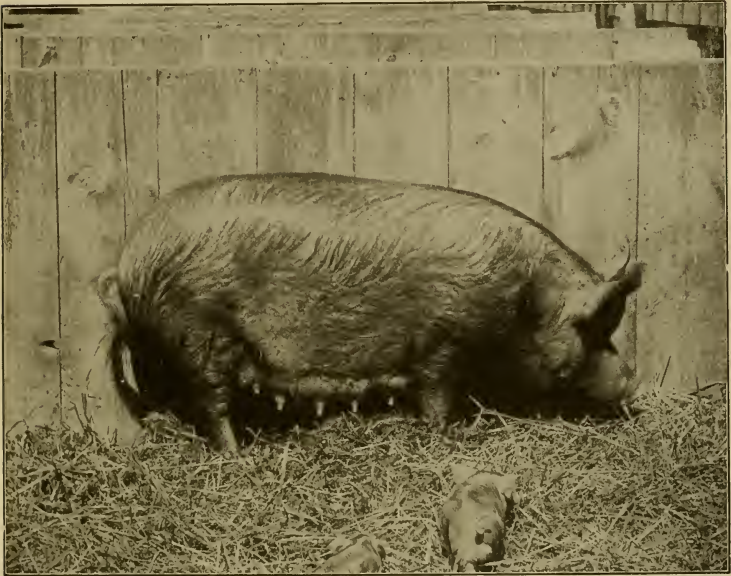
SCALE OF POINTS FOR FAT HOGS.

DESCRIPTION.		POINTS.
HEAD AND NECK—5 points:		
<i>Snout</i> , moderately fine.....		1
<i>Jowl</i> , full, broad, deep, smooth, and firm, carrying fullness back near to point of shoulder.....		2
<i>Neck</i> , short, thick, and deep; rounding and full from poll to shoulder top.....		2
FORE QUARTERS—12 points:		
<i>Shoulders</i> , broad and compact on top, deep, well fleshed, blending smoothly with neck and body.....		7
<i>Breast</i> , wide, deep, and full.....		3
<i>Fore Legs</i> , set well apart, short, tapering and straight; pasterns , upright; bone, clean and fine.....		2
BODY—35 points:		
<i>Back</i> , broad, straight or very slightly arched, medium length, uniform width from shoulder to ham, thickly fleshed, even and smooth without creases or projections.....		10
<i>Loin</i> , broad, strong, full, and thickly and smoothly fleshed.....		8
<i>Ribs</i> , long and well sprung at top and bottom.....		3
<i>Sides</i> , medium length, deep, smooth, even between shoulder and ham.....		6
<i>Heart Girth</i> , large, full back of shoulder, and deep and full at fore flanks.....		4
<i>Flank</i> , deep and full.....		1
<i>Underline</i> , straight, with no sagging nor flabbiness of belly.....		3
HIND QUARTERS—19 points:		
<i>Rump</i> , same width as back, long, slightly rounded from loin to base of tail, smooth.....		5
<i>Ham</i> , broad, deep, heavily fleshed, plump and reasonably smooth; flesh carried well down to hock on inside as well as at rear.....		12
<i>Hind Legs</i> , short, straight, set well apart and squarely under body; bone, fine and clean; pasterns , strong.....		2
QUALITY—16 points:		
<i>Ear</i> , fine and soft, (1); hair, fine and abundant, (1); skin, smooth, showing no tendency to wrinkle, (3); bone, fine and smooth in legs, fine in snout and head, and showing no prominence at side or top of shoulder, (5); flesh, firm and smoothly distributed over all parts, no flabbiness at jowl, fore flank, belly and ham, (6).....		16
SYMMETRY—5 points:		
All parts should be proportionately developed, so that in general appearance the animal is smooth, compact, and well balanced.....		5
WEIGHT: heavy for age.....		8
Perfection.....		100

BREEDS OF SWINE.

III. Large Yorkshires.

Yorkshire swine are of English origin, and in that country three types are recognized, viz.: Large Whites, Middle Whites, and Small Whites. In this country, practically only one type is known, the Large Whites, which are variously called Large Yorkshires, Improved Yorkshires, and Improved Large Yorkshires. The term "improved" is used



Improved Tamworth Sow, bred by J. E. Buthour, Buosford, Ontario, and property of Ontario Agricultural College, Guelph, Ontario.

because the modern Large Yorkshire is a modification of the original large white English pig, which was extremely coarse and hard to fatten.

Yorkshires are now one of the most popular breeds in Ontario, and they are rapidly gaining a footing in the other provinces of the Dominion as well as in the United States.

Characteristics.—Yorkshires are one of our largest breeds of swine. They vary considerably in type, and it requires skill in selection to breed them of uniform character. When intelligently selected, they are profitable feeders, growing rapidly, and becoming ready for the packer at an early age. They are well adapted to the production of bacon for



Improved Yorkshire Sow. property of the Ontario Agricultural College. Guelph, Ontario.

our export trade, as they produce a long side and a large proportion of lean to fat. They are reasonably hardy and very prolific. They are exceptionally valuable for crossing on the fatter types of hogs, giving to the progeny greater length and less tendency to excessive fatness. They are, perhaps, better adapted to pen feeding than to grazing, and they will stand forcing without becoming overfat.

Judging Yorkshires.—Yorkshires vary considerably in type and general qualities, and some of these types are very objectionable. The more old-fashioned strains frequently possessed extremely short, turned-up snouts, with the lower jaw often extending beyond the upper. While many good hogs possess this peculiarity, it is too commonly associated with very undesirable qualities to deserve popularity. Animals with this formation of snout often have a heavy jowl, neck, and shoulder, a short side, and a general lack of quality. Even though the animal may not possess these undesirable qualities in itself, there is a strong probability of their cropping out in many of the progeny. Then there is another extreme: the long, scrawny neck; narrow back; rough, bony shoulder; long, coarse-boned, puffy legs, and bristly coat. This type should be avoided as one would avoid the plague. It may have length, but is not a bacon hog. It lacks quality, which is essential to the bacon hog; and it is a hard feeder, which the bacon hog is not.

In the description which accompanies the scale of points, an attempt has been made to give an idea of what the Large Yorkshire should be. In judging, however, due allowance must be made for masculinity in the boar; and, provided he is right in other respects, a slight prominence of the side of the shoulder may be overlooked. The neck, also, is more heavily muscled than would be desired in a barrow, and it is possible to have the boar too fine in bone. It is a great mistake, however, to go to the other extreme and imagine that general coarseness and lack of quality, or a frame loaded with fat, indicates constitution. There should be activity, strength, and vigor without coarseness; smoothness and quality without overrefinement; length without weakness; substance and apparent thrift without obesity.

In judging of the length of the hog, it is not enough that it should be long from snout to tail. The most valuable part of the carcass lies back of the shoulder, and care must be exercised in noting the length between shoulder and ham. What appears at first sight to be a long animal will sometimes be found wanting in length of side, the shoulder extending far back and encroaching upon the side. This formation gives a carcass which is heavy at the cheap end. It is possible, however, to run to extremes in this connection also, for there is a limit to the length of middle which an animal may safely carry, and it is possible

to have an animal out of proportion in this respect. Strength must accompany length.

Sows should show no indications of coarseness, and should possess at least twelve sound teats.

SCALE OF POINTS FOR LARGE YORKSHIRE SWIN

	DESCRIPTION.	POINTS.
COLOR —2 points:		
	<i>White</i> , free from black hairs, and as far as possible from blue spots on the skin.....	2
HEAD AND NECK —8 points:		
	<i>Snout</i> , medium length, straight, or nearly so, moderately fine.....	1
	<i>Face</i> , slightly dished, broad between eyes.....	1
	<i>Eyes</i> , good size, full and bright.....	1
	<i>Jowl</i> , light and neat.....	2
	<i>Ears</i> , long, good width, moderately thin, slightly inclined forward, and fringed with fine hair.....	1
	<i>Neck</i> , medium length, muscular, but possessing no tendency to arch on top.....	2
FORE QUARTERS —15 points:		
	<i>Shoulders</i> , smooth, somewhat rounded from side to side over top and very compact; no wider than back, and not running back on side so as to shorten distance between shoulder and ham.....	8
	<i>Breast</i> , good width, and full.....	3
	<i>Fore Legs</i> , set well apart, medium length, and straight; pasterns, strong; bone, clean and strong; feet, compact.....	4
BODY —37 points:		
	<i>Back</i> , medium width, rising slightly above the straight line, and forming a very slight arch from neck to tail.....	8
	<i>Loin</i> , wide as rest of back, strong and full, but not unduly arched...	5
	<i>Ribs</i> , good length and moderately arched.....	3
	<i>Side</i> , fairly deep; long, smooth, and straight between shoulder and ham; a straight-edge laid over shoulder point and ham should touch the side throughout.....	10
	<i>Heart Girth</i> , full, but not flabby at fore flanks, filled out even with side of shoulder; there should be no tucked-up appearance back of fore legs, nor droop back of shoulder.....	5
	<i>Flank</i> , full and low.....	2
	<i>Underline</i> , straight; the belly should be markedly trim and neat.....	4
HIND QUARTERS —17 points:		
	<i>Rump</i> , same width as back, long and slightly rounded from a point above hips to tail, and somewhat rounded from side to side over top.....	5
	<i>Ham</i> , full without flabbiness; thigh, tapering towards hock without wrinkles or folds, and carrying flesh well down towards hock	8
	<i>Hind Legs</i> , medium length; hocks, set well apart, but not bowed outward; bone, clean and strong; pasterns, strong; feet, compact.....	4
QUALITY —13 points:		
	<i>Hair</i> , fine and abundant, (2); skin, smooth, showing no tendency to wrinkle, (2); bone, clean in legs, and showing no prominence on side and top of shoulder, (4); flesh, firm and smooth, with no flabbiness at jowl, fore flank, belly, or ham, (5).....	13

STYLE—3 points:

Active and sprightly in movement, walking without a swaying motion, and standing well up on toes..... 3

SYMMETRY—5 points:

All parts proportionately developed, so that the general appearance gives the impression of a well-balanced, strongly-built animal 5

Perfection 100

OBJECTIONS.

Snout.—Unduly short and turned up.

Jowl.—Heavy.

Ears.—Small, similar to Berkshire, or unduly coarse and drooping.

Neck.—Either long and scrawny, or extremely short and heavy.

Shoulders.—Extremely heavy, open on top, or extending far back on side so as to shorten distance between shoulder and ham.

Girth.—Light around heart, tucked up at fore flank, depressed back of shoulder top, narrow across floor of chest.

Back.—Either extremely narrow or extremely wide; either sagged or unduly arched.

Loin.—Narrow and weak.

Side.—Short; falling away at lower part, owing to short-curved rib.

Belly.—Either tucked up or sagging.

Ham.—Either bare or wrinkled and flabby.

Legs.—Long, coarse, crooked, deformed; bone puffy; pasterns weak; feet spreading.

Quality.—Hair scanty or coarse and wiry; skin wrinkled; flesh soft and flabby, or unevenly laid on.

Symmetry.—Undue development of certain parts in proportion to others.

IV. Tamworths.

Tamworth swine are also of English origin, and were quite extensively bred in England as early as the beginning of the past century. They have been greatly improved and modified of late years, and are to be found in large numbers at the leading shows in this country. They have also spread into the United States, though it is impossible to foretell their success in that country.

Characteristics.—They are admirably adapted to the production of export bacon, being lengthy, smooth-shouldered, light-boned, and producing a large proportion of lean to fat. They are reasonably hardy, and the better class of them are economical producers of bacon. The sows are prolific and good mothers, though in experiments at the Ontario Agricultural College, the young pigs scarcely grew so rapidly as

the Yorkshires. They are quite extensively used for crossing on other breeds.

Judging Tamworths.—The Tamworth is essentially a bacon hog, and must be judged as such. Fancy points must give way to utility, although heavy, drooping ears, and black spots are seriously objected to. Leaving the remarks on breed type out of consideration, what has been said in connection with judging Yorkshires applies with equal force to this breed.



Yorkshire Boar, bred and owned by the Ontario Agricultural College, Guelph, Ontario.

SCALE OF POINTS FOR TAMWORTH SWINE.

DESCRIPTION.		POINTS.
COLOR —2 points:		
Golden red without black spots in hair or skin.....		2
HEAD AND NECK —8 points:		
<i>Snout</i> , rather long, straight, and fine.....		1
<i>Face</i> , slightly dished, good width between eyes.....		1
<i>Eyes</i> , good size, full, and bright.....		1
<i>Jowl</i> , very light and neat.....		2
<i>Ears</i> , rather long, pointed, thin, erect, and fringed with fine hair...		1
<i>Neck</i> , medium length, muscular, but possessing no tendency to arch on top.....		2
FORE QUARTERS —Same as for large Yorkshire.		
BODY —Same as for large Yorkshire.		
HIND QUARTERS —Same as for large Yorkshire.		
QUALITY —Same as for large Yorkshire.		
STYLE —Same as for large Yorkshire.		
SYMMETRY —Same as for large Yorkshire.		
OBJECTIONS —Same as for large Yorkshire.		

V. Berkshires.

In the Berkshire we have another English breed, and one that is very extensively spread over Canada and the United States. Some years ago the utility of this breed was greatly injured by its breeders aiming to secure fancy points rather than to develop useful qualities. Color was regarded as of great importance, and, in addition, they bred for an extremely short snout, heavy jowl and neck, a broad, fat back, and very fine bone. Of late years Canadian breeders at least have been trying to get as far away as possible from the type mentioned above, and to bring the breed nearer the bacon type. Their efforts have met with a considerable degree of success, though there is still much to accomplish before the breed as a whole can be classed as an ideal bacon hog.

Characteristics.—There is a marked difference in the general type of Canadian and American Berkshires, for while Canadian breeders have been striving to lengthen the side and modify the type generally to meet the requirements of our market, Americans, on the other hand, have been breeding them solely for the production of the fat hog. Berkshires, as a breed, are very easy feeders, and mature early. They are hardy and fairly prolific. Perhaps their greatest faults from a market standpoint are their tendencies to shortness of side between shoulder and ham, and to undue weight of jowl, neck, and shoulder. They form popular crosses with Yorkshires and Tamworths, and the result of these crosses is usually a very good bacon hog.

Judging Berkshires.—Owing to the confusion of types, it becomes a difficult matter to judge Berkshires satisfactorily in Canadian showings. However, since the bacon hog is the leading hog in Canada, and since Berkshire breeders claim their favorites to be well adapted to the production of Wiltshire sides, it seems only reasonable to assume that they should be judged mainly from the bacon standpoint. It is true, that a very important use of Berkshires is to cross with such breeds as the Yorkshire and Tamworth, but even for this purpose they are all the better for approaching the bacon type very closely. There is, therefore, good ground for discounting the heavy jowl, neck, and shoulder, and the extremely broad back, and for insisting upon only a moderate development of these parts. Length, particularly between shoulder and ham, becomes of greater importance than depth and thickness. What has been said under Yorkshires regarding the danger of going to extremes, applies with equal force here, and the judge must not fail to emphasize constitution, quality, and symmetry.

Scales of Points.—Since there are two distinct standards for judging Berkshires, it has been thought advisable to give two descriptions. The first one assumes that the Berkshire is to be judged as a bacon hog,

and is recommended as a standard for Canadian breeders. The second description gives a very clear idea of the ideal Berkshire of the United States.

SCALE OF POINTS FOR BERKSHIRE SWINE AS BRED FOR BACON PRODUCTION.

DESCRIPTION.		POINTS.
COLOR—2 points:		
Black, with white on face, feet, tip of tail, and an occasional splash on arm.....		2
HEAD AND NECK—8 points:		
<i>Snout</i> , medium length and rather fine		1
<i>Face</i> , dished, good width between eyes		1
<i>Eyes</i> , good size, full, and bright.....		1
<i>Jowl</i> , light and neat.....		2
<i>Ears</i> , medium size, thin, and soft, almost erect, but sometimes inclining slightly forward in aged animals.....		1
<i>Neck</i> , medium length, muscular, but possessing little or no tendency to arch on top		2
FORE QUARTERS—Same as for large Yorkshire.		
BODY—Same as for large Yorkshire.		
HIND QUARTERS—Same as for large Yorkshire.		
QUALITY—Same as for large Yorkshire.		
STYLE—Same as for large Yorkshire.		
SYMMETRY—Same as for large Yorkshire.		
OBJECTIONS—Same as for large Yorkshire with exception of ears, which should read: Very large, coarse, or flabby.		

BERKSHIRE SWINE.

Description Adopted by the American National Association of Expert Judges.

DISQUALIFICATIONS.

Form.—Very large and heavy or drooping ears; small, cramped chest, crease back of shoulders and over the back so as to cause a depression in back easily noticed, deformed or crooked legs, feet broken down, so that the animal walks on pastern joints.

Size.—Overgrown, gangling, narrow contracted or not two-thirds large enough for age.

Condition.—Barrenness, deformed, seriously diseased, total blindness from any cause.

Score.—Less than sixty points.

Pedigree.—Not eligible to record.

DETAILED DESCRIPTION.

1.—*Head and Face*.—Head short, broad, coming well forward at poll, face short and fine and well dished, broad between the eyes, tapering from eyes to point of nose, surface even and regular.

Objections.—Head long, narrow and coarse, forehead low and narrow, jaws narrow or contracted. lower jaws extending beyond upper,

face long, straight between eyes, nose coarse, thick, or crooked, or ridgy.

2.—*Eyes*.—Very clear, rather large, dark, hazel or gray.

Objections.—Small, dull, blood-shot, deep set or obscure, vision impaired by wrinkles, fat or other cause.

3.—*Ears*.—Generally almost erect, but sometimes inclined forward with advancing age, medium size, thin and soft.

Objections.—Large, coarse, thick, round or drooping, long or large knuck, difference in form, size or position one with the other, animal unable to control their position.

4.—*Neck*.—Full, deep, short and slightly arched. broad on top, well connected with shoulder.

Objections.—Long, flat, lacking in fullness and depth.

5.—*Jowl*.—Full, firm and neat, carrying fullness back to shoulder and brisket.

Objections.—Light, flabby, thin, tucked up or wrinkled.

6.—*Shoulder*.—Broad, deep and full, not extended above line of back and being as wide on top as back, carrying size down to line of belly and having lateral width.

Objections.—Lacking in depth or width, thick beyond the line of sides and hams or extending above line of back, heavy shields on hogs under eighteen months of age.

7.—*Chest*.—Large, wide, deep and roomy, full girth, breast bone curving well forward, extending back on level, not tucked up, broad between fore legs.

Objections.—Flat, narrow at top or bottom, small girth, lacking depth or fullness, breast bone crooked or tucked up.

8.—*Back*.—Broad and straight, carrying same width from shoulder to ham, surface even and smooth without creases or projections and not too long.

Objections.—Narrow, swayed or hollow, dropping below a straight line.

9.—*Sides and Ribs*.—Sides full, smooth, firm and deep, carrying size down to belly and evenly from ham to shoulder. Ribs long, strong, well sprung at top and bottom.

Objections.—Flat, thin, flabby, not as full at bottom as top. Ribs weak, not well sprung at top or bottom.

10.—*Belly and Flank*.—Wide, full and straight on bottom line.

Objections.—Belly narrow and sagging. Flank thin and tucked up.

11.—*Ham and Rump*.—Hams broad, full and long; the lower front part of ham should be full and stifle well covered with flesh, coming well down on hock. Rump should have a rounding slope from loin to root of tail, same width as back and filling out on each side and above the tail.

Objections.—Ham narrow, short, thin, not projecting beyond and coming down on hock, cut up too high in crotch. Rump flat, narrow and too steep.

12.—*Legs and Feet*.—Legs short, straight and strong, set wide apart, with hoofs erect and capable of holding good weight.

Objections. — Legs long, slim, coarse, crooked, muscles light, pastern long, slim or flat, feet long or sprawling.

13.—*Tail*.—Set well up, fine, tapering and neatly curled.

Objections.—Coarse and straight, too low.

14.—*Coat*.—Fine, straight, smooth, lying close to and covering the body well, not clipped, evenly distributed over body.

Objections.—Hair coarse, harsh, wavy or curly, not evenly distributed over body, swirls or clipped.

15.—*Color*.—Black, with white on feet, face, tip of tail and an occasional splash on arm.

Objections.—Solid black or black points, or white spots on body.

16.—*Size*.—Large for age. Boar two years and over not less than 450 pounds, sow same age 400 pounds. Boar eighteen months 350 pounds, sow same age 325 pounds. Boar twelve months 300 pounds, sow same age 275 pounds. Boar and sow six months 150 pounds.

Objections.—Under weight, coarse, not in good form to fatten.

17.—*Action and Style*.—Action, vigorous. Style, graceful and attractive.

Objections.—Dull, sluggish and clumsy.

18.—*Condition*.—Healthy, skin clear of scurf, scales or sores, soft and mellow to the touch, flesh fine, evenly laid on and free from lumps, hair soft and lying close to body, good feeding qualities.

Objections.—Unhealthy, skin scaly, scabby or harsh, flabbiness or lumpy flesh, too much fat for breeding. Hair harsh, dry and standing up from body, poor feeders, deafness, partial or total.

19.—*Disposition*.—Quiet and gentle and easy to handle.

Objections.—Cross, restless, vicious and wild.

HORSE BREEDING.

By Prof. J. Hugo Reed, V. S., Guelph, Ontario.

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- I. THE LAW OF HEREDITY OR SIMILARITY.—II. THE LAW OF VARIATION.—
III. LAW OF HABIT.—IV. THE LAW OF ATAVISM OR STRIKING BACK.—V.
THE LAW OF CORRELATION.—VI. THE LAW OF FECUNDITY OR POWER TO REPRO-
DUCE.—VII. IN-BREEDING AND IN-AND-IN-BREEDING.—VIII. CROSS-BREED-
ING.—IX. THE RELATIVE INFLUENCE OF PARENTS.—X. INFLUENCE OF
A PREVIOUS IMPREGNATION.—XI. INTRA-UTERINE INFLUENCE.—XII. SEX
AT WILL.—XIII. CARRIAGE HORSES.—XIV. SADDLE HORSES AND HUNTERS.
—XV. COBS.—XVI. ROADSTERS.—XVII. POINTS OF THE HORSE.—XVIII.
THE EXTERNAL CONFORMATION OF THE HORSE.—XIX. CONFORMATION OF THE
HEAVY DRAFT STALLION.—XX. CONFORMATION OF MARE OR GELDING.—
XXI. CONFORMATION OF COACH STALLION.—XXII. CONFORMATION OF CAR-
RIAGE MARE OR GELDING.—XXIII. CONFORMATION OF THE HACKNEY STALL-
ION.—XXIV. CONFORMATION OF THE STANDARD-BRED STALLION.—XXV.
CONFORMATION OF THE THOROUGH-BRED STALLION.—XXVI. CONFORMATION
OF THE THOROUGH-BRED GELDING OR MARE.
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Present conditions point clearly to the fact that horse breeding can be carried on with a reasonable prospect of fair profit. I do not mean to advise farmers to go exclusively, or even extensively, into horse breeding, but to have one or more mares breeding every year, as I think any person following mixed farming should. While to-day even the horse of no particular breeding or characteristics to particularly recommend him (the mongrel, we might say) will command a fair price, I do not recommend his production. The time for the patronage of the impure bred sire at a low stud fee is past. In order that a man may successfully and profitably breed horses, a few things are essential. In the first place, he must be a fair judge of a horse, he must understand the desirable conformation, action and characteristics of the horse he is trying to produce, and the greater his knowledge of the internal economy—as bones, muscles, ligaments, nervous, thoracic and abdominal organs—the better. He must, provided he intends breeding for the market, carefully study the horse markets and ascertain which classes of horses are in demand at fair prices. Then he must decide which of those classes his particular tastes or fancies, conditions or environments warrant him in endeavoring to produce. He must fix in his mind a definite standard and then work up to that standard.

He must not expect to reach his ideal all at once: he must have patience and perseverance, must not become discouraged if he be disappointed in his first attempt. Success in breeding horses, as in all other departments of farm management, must be measured by the actual



TANDEM TEAM.

Owned by R. S. C. Kaulback, Lunenburg, Nova Scotia. The shaft horse, "Homer," won first prize for carriage horse at the Provincial Exhibition.

value of the products and the profits that may be derived from them. The relative value of animals depends upon their adaptation to a particular purpose, and the returns they make for expense incurred and food consumed. The man who contemplates breeding horses for profit should carefully study the "Laws of Breeding." He must recognize that reproduction is governed by certain laws. There is no such thing as chance in breeding. All occurrences that appear as such can be explained if we are acquainted with the history of the sires and dams for generations back. We will now mention a few of the principal laws of breeding, some of which the breeder can control, others he cannot.

I. The Law of Heredity or Similarity.

The greatest and strongest law of breeding is the law of heredity or similarity, or, in other words, "like begets like." But we have deviations from this law which are often hard or impossible to explain. The law is not absolute. It is necessary for the maintenance of species. In this respect it is absolute; the law of variation is necessary for the improvement thereof. Breeds have been improved and new breeds developed by crossing. The law of heredity is so strong that it teaches us to be careful in the selection of both sires and dams for breeding purposes. It is claimed by many that the intellectual and nervous points of the offspring are imparted to a greater extent by the dam, and the external conformation and constitution more by the sire. (This is a disputed point.) Not only are desirable qualities, as conformation, constitution, disposition, etc., transmitted from the parent to the offspring, but also undesirable qualities, and also diseases, or at least a tendency or hereditary predisposition to diseases, such as ophthalmia, spavin, ringbone, and other bone diseases, roars, heaves, chronic cough, etc. Youatt says there is scarcely a disease but is to a certain extent hereditary. If we accept these as facts, we will readily perceive the importance of exercising great care in the selection of animals for breeding purposes—both sires and dams. Don't undervalue the dam. One of the greatest mistakes often made is to breed a mare that is worthless, or nearly so, expecting her to produce a good foal. We often hear the expression, "That mare is not of much account, but she will do to breed." If the dam be inferior it is quite unreasonable to expect the progeny to be a high-class animal, even though the sire be a superior one. It goes without saying that a parent cannot impart to her progeny qualities that she does not herself possess. Another mistake often made is, a man has rather an inferior mare, and he does not consider he is warranted in paying the necessary fee to secure the services of a first-class stallion for her, and hence breeds her

to a low-priced and inferior animal. If a mare be worth breeding at all, she should be bred to the very best stallion of her class whose services can be secured for a reasonable stud fee. Even a rather inferior mare, if mated with a first-class sire, will in all probability produce a fair foal, a better animal than herself, but usually inferior to the sire. Deformities and diseases are not always transmitted to the progeny, but frequently they are affected for three or four generations by such things. When accidents happen to mares during pregnancy, the offspring is liable to be affected thereby. If the law of heredity were absolute or invariable, all breeding operations would be of a very monotonous character, but inferior animals or plants can be improved by careful breeding, and this is called

II. The Law of Variation.

On this law the breeder places most of his expectations in breeding. For instance, grain or corn will adapt itself gradually to whatever climate you continue to grow it in. The coarse corn of the South, sown in this country, will grow tall and rank, and but few grains will ripen before the early frosts. Each time it is grown it becomes better and better until it becomes adapted to the climate, unless there comes a very early frost, when the whole will be destroyed. Most vegetables can be traced to some worthless little plants found on some of the hills of Great Britain or France. The various races of human beings are accounted for by the law of variation. The same law applies to domesticated animals. What was the original of each species we can form only our own opinions. As an instance, we may take the turkey, unknown in the old world until about two hundred years ago, and now the varieties are numerous, and differ greatly in size, form, color, etc. All these varieties have been developed gradually by careful breeding from the wild turkey. These changes can be traced to three causes, viz. : climate, supply and nature of food, and habit. Climate has great influence on the constitution and organization. Animals of hot climates are very different, especially in regard to the skin and its coverings, to those of cold climates. In warm climates the covering is thin and light, while in cold, wet climates there is a fine wool next the skin, and growing through that there is a coarse variety of hair to throw off the wet, etc. The great work of Nature is to protect the true skin from wet and cold, which affect the internal organization.

The supply of food has a great influence on the form and habits of animals. In the low, natural pastures of England, where food is plentiful and of good quality, the stock is large, heavy and indolent, mature and fatten quickly, while on the mountains of Wales or the

Highlands of Scotland the stock is the opposite, being small, lively and very hardy, capable of living on little food and thriving, and standing exposure to cold sufficient to cause the death of animals not accustomed to such usage.

III. The Law of Habit.

The habits and characteristics of animals that have been developed by the conditions in which they are placed, or the peculiar training they have received at the hands of man, appears to be transmitted from generation to generation with nearly as much certainty and uniformity as those that characterize the original type or species from which they descended. Some of the most striking characteristics of this form of heredity are to be found in the transmission of the highly artificial peculiarities that characterize the various improved breeds of animals. The tendency to lay on fat rapidly and mature early is inherited in the best strains of Shorthorns, Devons, Herefords and other meat-producing breeds of cattle, while the ability to secrete an abundant supply of milk is, in a like manner, perpetuated in the Ayrshire, Jersey and other dairy breeds. The certainty with which these acquired qualities are transmitted constitutes one of the most valuable peculiarities of the breed. The American trotting horse furnishes a well-marked illustration of the inheritance of acquired characteristics. The various breeds of dogs have peculiarities that have been developed by a long course of training, which are transmitted with a uniformity that is surprising. Young setters, pointers and retrievers that have never been in the field will often "work" with nearly as much steadiness and ability as those that have had a long experience in hunting and sporting. In such cases, however, it will be found that their ancestors, immediate or remote, have been well trained to their special method of hunting.

The shepherd dog is remarkable for its sagacity and the permanence with which it carries out the will of its master, and it would be difficult, if not impossible, to train dogs of any other breed to equal them in their special duties. The greyhound hunts by sight and the bloodhound by scent, and their offsprings all inherit the same peculiarities. Habits not peculiar to any particular breed of animals are often inherited, for instance, tricks taught to dogs, as sitting up, begging, etc., are sometimes performed by their puppies without their having been taught. The handwriting of members of the same family frequently have a marked resemblance. There are families in which the special use of the left hand is hereditary. It must be admitted, however, that acquired habits are not in all cases hereditary, but it would be difficult to fix a limit of their inheritance. Acquired habits and the

original traits of animals appear to be conflicting elements in their constitution, either of which may, from its intensity, predominate in hereditary transmission. Pigs have been taught to point game, play cards, and perform various tricks, but in the hereditary transmission of these characters Nature has had a stronger influence than culture. There seems to be reason to believe that such hereditary transmission is limited to acquired peculiarities which are simply modifications of the natural constitution of the race, and would not extend to such as may be altogether foreign to it. From a practical point of view, however, the inheritance of acquired characteristics, so far as they are of any value, is fortunately without apparent limit. Abnormal characteristics are frequently hereditary, but they are not so likely to be transmitted as acquired habits that are in harmony with the original peculiarities of the animal. It is stated on good authority that animals that have been branded in the same place for several successive generations transmit the same mark to their offspring. Dr. Brown-Sequard, in experimenting with guinea-pigs, observed that in those subjected to a peculiar operation, involving a portion of the spinal cord or sciatic nerve, a slight pinching of the skin of the face would throw the animal into a kind of epileptic convulsions. When these epileptic pigs were bred together their offspring showed the same predisposition without having been operated upon, while no such tendency showed itself in a large number of pigs bred from parents that had not been subjected to the operation.

IV. The Law of Atavism or Striking Back.

Any peculiarity of an ancestor, more or less remote, whether of color, form, habits, mental traits or predisposition to disease, may make its appearance in the offspring without having been observed in the parents. Numerous cases illustrative of this law are reported, and I have no doubt many readers of this article can call to mind cases in their own experience. Mr. Dawson reports the case of a pointer bitch having given birth to a litter of seven puppies. Four were marked with blue and white, which is so unusual a color with pointers that she was thought to have played false with a greyhound, and the whole litter was condemned, but the gamekeeper was allowed to keep one as a curiosity. Two years later a friend of the owner saw the young dog and declared that he was the image of his old pointer bitch, Sappho, the only blue and white pointer of pure descent which he had ever seen. This led to a close inquiry, and it was proved that he was the *great-great-grandson* of Sappho, so that he had only one-sixteenth of her blood in his veins. Goodale states that many years ago there were a few polled cattle in the Kennebec Valley, but they finally became extinct. For thirty-five years after the last of these

polled cattle were killed, the cattle on the farm of Mr. Wingate all had horns, but at the end of that time a polled animal made its appearance in the herd. In the well-known case of George III. of England, the insanity was transmitted by atavic descent from a male ancestor eight generations back—not only the insanity, but other of the well-known characteristics of the unfortunate monarch were exactly repeated. In the Shorthorn herd book may be found numerous instances of the atavic inheritance of color, and almost every breeder can furnish from his own experience instances of a similar nature. Occasionally a black lamb appears in a flock in which black sheep have not been present for several generations. In a large family we seldom find all the children resembling either parent, and in many instances the resemblance to a grandparent or some more remote ancestor prevails to so great an extent that the obvious peculiarities of the immediate parents are obscured.

V. The Law of Correlation.

Any peculiarity in the development of one organ or set of organs is usually accompanied by a corresponding modification or suppression of the organs of some other part of the system. The correlated structure of animals enables the comparative anatomist, from the examination of a tooth, to determine not only the class and order to which the animal belonged, but its habits and mode of life and character of food required for its support. It is claimed that when any particular part of the body acquires a very high degree of development certain other parts stop short of their ordinary state of evolution, as if the former obtained its unusual increment at the expense of the latter. The law of correlation is thus illustrated in herbivorous mammals. A limb terminating in a hoof serves for locomotion, and it cannot be used as an organ of prehension, to grasp, seize or tear, and the teeth of these mammals have flat, roughened grinding surfaces, while in carnivora the feet are supplied with nails and claws which enables the animals to use them for prehension and holding flesh, etc., while the teeth are fine and pointed and the muscles of mastication strongly developed. In blind people the sense of touch attains a delicacy that is surprising. Cases are on record of blind people who could not only distinguish colors but shades of the same color by the sense of touch.

VI. The Law of Fecundity or Power to Reproduce.

The fertility of animals is frequently influenced by changes in their surroundings and habits that cannot of themselves be considered unfavorable to the healthy action of the system. It has been observed that the procreative powers are impaired, or even

entirely wanting, in many wild species when placed in close confinement. Domesticated animals are, as a rule, more prolific than the wild; no doubt due in a great measure to a better supply of food throughout the year, and the more uniform condition in which they are placed. The activity of the reproductive organs is necessarily dependent upon the functions of nutrition which supplies the material concerned in the operation. There is a certain degree of antagonism between the nutritive and the generative functions, the one being executed at the expense of the other. When the function of nutrition is impaired by disease, or when the supply of food is not sufficient for the wants of the system, the reproductive powers suffer a corresponding decrease in their activity. Sheep bred on rich pastures more frequently produce twins than those pastured on poorer lands. While full feeding seems to increase the fecundity, any excess in the nutritive activity of the system will as readily impair the powers of reproduction. It is hard to say whether underfeeding or overfeeding has the greater effect on fecundity. To be prolific an animal requires to be kept in moderate condition. There seems to be a marked relation between the size of animals and their fecundity. Throughout the entire animal kingdom the small species of animals appear to be more prolific, and, as a rule, breed at an earlier age and at shorter intervals and produce a greater number of young at a birth. It is a well-known fact that members of certain families of any species are more prolific than members of other families. Among cattle it is said that when twins are produced, a male and a female, the latter, called a free martin, is, as a rule, barren; when twins are of the same sex the reproductive powers are normal. In free martins the internal generative organs are said to be imperfect, partaking of the character of both sexes. In appearance these imperfect animals often resemble males.

VII. In-Breeding and In-and-in-Breeding.

In-breeding indicates the breeding together of distant members of the same family. In-and-in-breeding the breeding together of very near relatives. The line of distinction between the terms is very hard to define. Various opinions exist in regard to this line of breeding, many claiming that in-and-in-breeding produces a delicacy of constitution, others disclaiming this fact. My experience is that it is not well to breed too close, but that judicious in-breeding is generally successful. We can thereby intensify any desirable qualities the family may possess. Many cases of in-and-in-breeding in fowls and sheep with favorable results are reported. In wild animals, where it is carried on without restraint, we notice the species do not deteriorate, due to the fact that the best and strongest

males drive the weaker ones away; hence the offspring is the produce of the best specimen of the male.

VIII. Cross-Breeding.

Strictly speaking, cross-breeding is the pairing of animals of distinct breeds, and in this limited sense it may be considered the opposite of in-and-in-breeding. But the term cross-breeding or out-breeding is frequently used to indicate the mixture of the blood of different families of the same breed. Cross-breeding has, probably, been carried on more in sheep than in any other animals, frequently with good results, but often the reverse. Some animals, the mountain breeds of sheep, for instance, that have been bred on the mountains for years and years, have acquired such individuality of form, constitution, etc., that the introduction of improved rams gives very poor results. Cross-breeding can have but two objects: either the improvement of existing breeds or the production of a new breed. To cross-breed with the idea of obtaining a new breed requires a great deal of knowledge, patience and wealth, and can be successfully carried out by very few. To improve for the purpose of slaughter or for the improvement of other qualities is a different thing, and for these purposes judicious cross-breeding (not too violent crosses) is likely to be successful. Crossing must be done by degrees; extreme or violent crosses are not to be tolerated. In breeding horses a farmer breeds either for his own use or for the market. If for his own use, he must make up his mind what class of horses is best suited to his purpose, and then be careful in the selection of both sire and dam. If for the market, he naturally considers what class is in the greatest demand at the best prices, and, having decided that question, goes intelligently to work to produce it.

IX. The Relative Influence of Parents.

Many diverse opinions are given by writers as to the relative influence of parents upon the progeny, some of which, without sufficient reasons, have been quite generally accepted as established facts. My opinion is, that the condition and general constitution of animals during the time of copulation has great influence upon the offspring, and, provided both sire and dam be in good health, the one of the better breeding, that is the animal that is the produce of ancestors that have been bred in a certain line for generations, and has the characteristics of that special family intensified in him or her, which evidently gives him or her greater prepotency, will have the greater influence upon the progeny. The importance of securing males of the best quality—males that from their superior breeding will be likely

to be prepotent—to mate with the mares at our disposal, cannot be too strongly urged as one of the readiest means of improvement. It is generally admitted that the straighter or less mixed the breed is, the greater the probability of its transmitting to the offspring the qualities it possesses, whether these be good or bad. Economy has made the male ancestor the most important, simply because he sires a great many foals while the mare produces only one each year.

X. Influence of a Previous Impregnation.

The influence of the male in the process of breeding is not limited to his immediate offspring, but extends through the female that he has impregnated to her offspring by another male. Paradoxical as this statement may appear, there are many well-authenticated cases on record that cannot be explained in any other way. It is authentically stated that in 1815 a chestnut mare, seven-eighths Arabian, was covered by a Quagga (a species of Zebra). The hybrid produced resembled the sire in color and many characteristics of form, etc. In 1817, 1818 and 1821 the same mare was bred to a pure-bred Arabian stallion and produced three foals, all of which bore the curious markings of the Quagga. Instances of this kind in a less marked degree have been noticed by many breeders. Although any impregnation may have influence upon successive ones, the first is of the most importance. It is probable that the female has received, through the fœtal circulation, some of the attributes the fœtus has derived from the male, and that these are communicated along with those proper to herself to the offspring of a different male. It is claimed that when a pure-bred female of any breed has been impregnated by a male of another breed she becomes a cross—loses her purity of blood in consequence of her connection with the foreign animal. It may be said that the act of fecundation is not an act that is limited in its effect, but that it affects the whole system, the sexual organs especially, and in the sexual system the ovums to be impregnated hereafter are so modified by the first act that later impregnations do not efface the first impression.

XI. Intra-Uterine Influence.

The abnormal peculiarities sometimes observed in animals at the time of birth, that are not recognized as family characteristics, have been popularly attributed to some mysterious influences of the imagination of the mother in the process of intra-uterine development. Some claim that this law is noticed even in fowls. It is stated that the ambition, courage and military skill of Napoleon Bonaparte had their foundation in the fact that the Emperor's mother fol-

lowed her husband in his campaigns, and was subjected to all the dangers of a military life; while, on the other hand, the murder of David Rizzio in the presence of Queen Mary was the death-blow to the personal courage of James I., and occasioned that strong dislike of edged weapons for which that monarch was said to be remarkable. Various instances can be cited of deformities, monstrosities and birth-marks in the human family traceable to frights, etc., received by the mother during pregnancy. The same law acts, but not to so marked an extent, in the lower animals. I call to mind one well-marked case of the effect of a fright received by a mare during the act of copulation. A farmer bred a half-bred Clydesdale mare to a pure-bred Clydesdale stallion. Both sire and dam were good individuals, with full manes and tails. This farmer owned a dog with a very short tail, and he had the habit of interfering with any of the stock that were fighting. The stallion came to the farm to serve the mare, and during the act of copulation the dog, evidently thinking his services as a peace-maker were in demand, caught the stallion by the tail and growled and swung from side to side. The groom ran back and gave the dog a kick, and he ran towards the barn, passing directly in front of the mare. This mare produced to this cover, and the foal, while perfect in form, had only a few hairs and no dock where the tail should be. This animal is still owned by the breeder. I saw her a few months ago, and she is a fair representative of her class, being well developed in all points except the above. I cannot explain this phenomena in any way except that the mare was startled by the sudden appearance of the tailless dog, and it caused such a nervous impression as to cause the development of a fœtus with the same peculiarity.

XII. Sex at Will.

Various theories have been advanced to produce sex at will, but, as far as I can learn, all have failed in actual practice.

If we recognize the foregoing laws as governing factors in the reproduction of horses, it teaches us that too great care cannot be exercised in the selection of animals for breeding purposes, and also that great care of the dam during pregnancy is demanded. As to the hygiene of pregnant mares, it does not differ in many respects from that of other animals. The mare should be kept in moderate condition and be given regular exercise during pregnancy, or else regularly used at ordinary work. She should not be subjected to excessive muscular exertion, and should not be worked much under saddle, and, if ridden at all, spurs should not be used; the excessive muscular contraction often caused by the application of the spur is liable to cause abortion. If we are breed-

ing with the hopes of producing speed, I think it well to speed the mare for short distances at whatever gait we expect to produce, as I think the offspring inherits to a certain extent the habits of the dam, especially those exercised during the period of gestation, but she should on no account be speeded for sufficient distances to produce fatigue. The food and water should be of the very best quality, the food easily digested and given in reasonable quantities. The premises in which she is kept during cold weather should be roomy, thoroughly clean and well ventilated. All undue nervous excitement should be avoided, also the absence of all nauseous odors, and all operations that necessitate the casting of the animal or the letting of blood. The administration of drastic purgatives should also be avoided, if possible, for these have a tendency to produce abortion. When the time of parturition approaches she should be carefully watched and, if necessary, skilled assistance called in. As before mentioned, the prospective breeder should carefully consider the class of animal he will endeavor to reproduce, and, having decided that point, he should provide himself with one or more mares of that class, of the best quality his means will allow. Unless he can provide a mare or mares of at least fair quality he had better not breed at all, as the results will surely be disappointing from the reasons already stated. I do not consider it necessary to secure pure-bred mares; of course it will be all the better if such can be got, but the price of good pure-breds of any class is beyond the means of the ordinary breeder. Having secured the dams for our prospective stock, the next point is to select a sire. Unfortunately, there are many owners of stallions who think it is the duty of their friends to patronize them. This is altogether a mistake. The breeding of horses is a business matter, and must be considered purely from a business standpoint in order to make it a success; and the man who breeds his mare to an unsuitable stallion simply because he is owned by a friend, not only is doing himself an injustice, but his friend an injury. The result will, with very few exceptions, be the production of a nondescript, and as a stallion's value in a community is determined largely by the quality of his stock, the production of a colt of this kind will injure his reputation to a much greater extent than can be compensated by the stud fee received. A breeder must carefully study his mare in regard to conformation, temper and general peculiarities, and, remembering the law that "like begets like," select a sire that should be suitable. If the mare be deficient in some particular point, select a stallion that is well developed in that point; if she have hyper-development of any point, see, if possible, that the sire is rather deficient there. If she be of hyper-nervous disposition, select a phlegmonous sire, and *vice versa*. In

all cases be careful to ascertain that both parents are not affected with any disease the predisposition to which will probably be transmitted to the progeny. Diseases or malformations that can be traced directly to injuries, of course are not transmissible. Undesirable traits of disposition, as viciousness, stubbornness, etc., are as much to be avoided in breeding animals as disease. The classes of horses that at the present time are in demand at fair prices are: heavy draft, carriage, saddle horses and hunters, and good, strong, clever roadsters. Other classes that cannot be produced by any special line of breeding are good chunks of 1300 to 1400 pounds, and cobs with extreme action.

In selecting stallions to sire any of these classes out of the mares at our disposal we should insist upon both individuality and pedigree. The time when pedigree alone was considered is fortunately past. A horse with a good pedigree but poor individuality, a poor or inferior animal of his class, is of course not a suitable animal for a sire. Get both if we can, but I would sooner sacrifice pedigree than individuality. In mentioning the classes of horses that the farmer can produce I have purposely omitted race horses. I do not consider it is the province of the ordinary farmer to try to produce horses to race at any gait. The percentage of horses produced that are fast enough to win money at any gait on the race track is very low, and if a farmer of ordinary means should produce one it will cost him a great deal to develop his speed. My observation has been that the farmer who has attempted this has generally ruined himself financially unless he has sense enough to see how things were going and given it up before he has spent his all in trying to produce a world-beater. Therefore, I say, leave the production of race horses in the hands of the millionaire, and endeavor to produce an animal that has a fair value at four or five years old without much development or handling. Let the dealer educate the horse for the city market. Of course this applies to the lighter classes of horses that require a considerable amount of education to fetch the fancy prices occasionally paid. If the farmer has time and experience in such matters it will probably pay him to put the finished article on the market; but as a rule it pays him to sell the young horse in the green state to the dealer for a reasonable price, and let him take the trouble and chances of giving him manners and action and selling him for a fancy price, provided, of course, he develops into a superior animal. The light classes of horses, as carriage horses, cobs, saddlers and hunters require good manners and willingness and ability to perform cleverly the functions peculiar to the class before they can be put upon the market as a finished product. The education of such horses is, we may say, a business by itself, and the farmer who attempts it, even though

he may be very capable and competent, must of necessity neglect his general farm operations, therefore we contend that he should, as a rule, sell his horses partially green. Of course it pays to have the horse tolerably handy in harness or saddle in order to be able to show the prospective purchaser that he is capable of developing, with proper handling, into a good specimen of his class. It is a mistake to let a colt remain entirely unhandled until four or five years old, and then offer him for sale in that condition. The average dealer will not buy a perfectly green one, as it is generally a hard and dangerous task to handle a big four or five-year-old colt that has never been accustomed to restraint of any kind, and a horse that will drive in single or double harness or carry a man on his back, what we might call a partially educated fellow, is worth a great deal more money than the same animal perfectly green. Draft horses, weighing from 1400 to 1700 pounds, are produced by breeding good mares of this class to a sire of any of the recognized breeds of draft horses, and especially to the Clydesdale or Shire. Percherons and Suffolk Punches have not proved producible sires in this country, but the two former classes have proved very successful, and they are so much alike it is not necessary to go minutely into the distinguishing characteristics. The Clydesdale is probably the most popular, and certainly the most plentiful, but it is rather hard to say why it is so. Many claim that the draft colt can be reared with much less risk and with less liability to accident and disease than the lighter classes. This can probably be explained from the fact that the colt of this breeding is naturally a quieter and more settled animal than those of lighter breeds and hotter blood, and consequently less liable to injure himself from exuberance of spirit while in the pasture field or paddock. And then again, small bunches, or blemishes, are not considered of as much consequence, nor can they be as easily seen, especially on the limbs, on account of the amount of coarse hair, on a heavy colt as on a light animal. If we decide to breed heavy horses we should decide what particular breed we will produce, and then stick to that breed. If disappointed in the first production, do not get discouraged and try another breed; probably it will be well to try another sire of the same breed, as there may be some reason why the first sire did not nick well with our mare; but stick to the original selection of breeds, and if we use ordinary intelligence success is bound to attend us.

In the selection of a sire for any class of horses it is well, if possible, to drive around in the section in which he has stood in previous years and view his stock. It is sometimes the case that a stallion whose appearance and pedigree lead us to the conclusion that he should be a good sire is disappointing, and on the other hand an animal apparently

not so good will prove valuable in the stud. In viewing the product of a stallion we must, of course, note carefully the mares out of which the colts have been produced.

XIII. Carriage Horses.

Carriage horses, as a rule, are not pure-breds. We have in this class pure-bred Hackneys, Cleveland Bays and French and German coach horses, which are pure-bred, but as there are few pure-bred mares of any of these classes in this country, the farmer who attempts to produce carriage horses must use as sires the above mentioned sires or the standard-bred or thoroughbred. The selection of a sire for carriage horses must be largely governed by the mare to whom he is to be bred. In my opinion the Hackney is the only horse that truly comes up to the standard at present demanded in this class of horses. He has fair size, beauty, a fair amount of quality and the extreme action, both fore and aft, that is required. The carriage horse of the present day must have free, easy, high and attractive action of both knees and hocks; he must be of fair size and quality with attractive appearance, both when standing and in motion. His action must not only be high but in a straight line, neither paddling nor rooling his fore feet; he must not go wide behind, nor yet so close as to interfere. While we try to get symmetry, quality and style along with the required action, we must have action even though we sacrifice some of the other qualities. I have stated that in my opinion the Hackney is the true carriage horse, and we would therefore think that he should be used in all cases to sire such. But a great deal depends upon the mare. My experience has been that the produce of the Hackney out of a cold-blooded mare is not a satisfactory animal for any purpose; he will in most cases be coarse, lack quality and ambition, and while he may be possessed of a fair amount of action, his very noticeable lack of other desirable characteristics and ambition render him almost worthless for the purpose for which he is intended. Therefore, unless the mare has considerable hot blood (by hot blood I mean the blood of a thoroughbred), it will not be wise to mate her with the Hackney. If we have a half-bred or even a quarter-bred mare of the desirable size, she should produce well if crossed with the Hackney. The dam in this case will, in all probability, impart quality, and the sire action and style, to the offspring. Other sires for the production of carriage horses are coach stallions. The same remarks as to quality in the mare apply here as to the Hackney. These stallions are likely to produce larger stock, and many of them have very good action, and when large carriage horses are desired they should have the preference. Many first-class horses

of this class have been sired by the standard-bred stallion, and in fact many prize-winning carriage horses are standard-bred. At the same time, I do not think it wise to breed standard-breds with the hopes of producing carriage horses. Horses of this class have been bred for many generations with the sole idea of producing extreme speed at the trotting or pacing gait, and as a rule they lack the conformation and style demanded in the carriage horse, and seldom have the desired action, and while we occasionally find one that fills the bill, it is the rare exception. And we do not wonder at this, as he has not been produced with this idea. At the same time there are many big, clever, stylish, high-actioned standard-bred stallions in the country that are well qualified to produce carriage stock if intelligently mated. The mares to be bred to these stallions with this idea must be of fair size and qualified with the characteristics of a carriage horse well marked. If we are breeding to the standard-bred with the hopes of producing speed, we will, of course, select a stallion that can trot or pace fast, not paying so much attention to size, quality, etc. But if breeding for carriage purposes, speed is not at all essential. One danger in this line of breeding is the fact that standard-breds, even though true, natural trotters, are liable to produce pacers, and of course this is a gait that cannot be allowed in a carriage horse. Many good carriage horses have been sired to the thoroughbred. We can breed a coarse mare with good action to this horse with greater prospects of success than to any other sire. He will impart to the progeny the necessary quality and ambition, and the dam will impart the necessary action; but in order that we may get the desired action for carriage purposes in this line of breeding, we must have the action in the dam. As the action of the thoroughbred, while very elastic, is naturally rather close to the ground, and, as he has such great prepotency, it requires extreme action in the dam to overcome this characteristic.

XIV. Saddle Horses and Hunters.

Suitable horses of this class are, with few exceptions, the progeny of the thoroughbred. I might here make a few remarks about the term "thoroughbred." There is but one animal in the world that is entitled to the term, and that is the English running horse and his pure descendants. The term is often misapplied, both in print and conversation. We read of thoroughbred cattle, thoroughbred sheep, pigs, fowls, dogs, etc., etc. It should not be; we should use term "pure-bred." We have pure-bred cattle, pure-bred sheep, etc., etc., and in horses we have pure-bred Clydesdales, pure-bred Shires, standard-bred horses, etc., but the term "thoroughbred" needs no

qualifications whatever. It applies to the one animal and to him alone.

The thoroughbred, we may say, without danger of successful contradiction, is the purest domesticated animal produced. He has been carefully bred in certain lines for centuries and careful records have been kept. Doubtless he originated by intelligent crossing; but crossing ceased so long ago that he may truly be called thoroughbred. On account of his careful breeding and strong individuality he has greater prepotency than any other sire. (By prepotency we mean the power or ability to transmit to his progeny his own characteristics.) On this account we need to be even more careful in selecting a sire from this class than from others—as if there be any undesirable points or characteristics, whether of conformation or disposition, in the sire, they are liable to be even more marked in the progeny. Therefore, we must not breed to a thoroughbred simply because he is thoroughbred, but be careful to select a sire that is of the required size, sound, of good conformation and disposition. We can, as already stated, breed a coarser mare to this horse than to others. His progeny, except from very coarse mares, seldom lacks quality and ambition. Of course even with this sire the cross must not be too violent. Violent or too well-marked crosses in any case are seldom followed by satisfactory results. The produce of the thoroughbred generally excels in the saddle and makes a fair harness horse. He is the best all-round horse. The market for the good sized half-breed is, always has been, and I think it probable always will be, good. He, with the carriage horse, is the rich man's horse, and when we are able to supply the animal men of this class want, price will not prevent his sale. It is not a hard matter to produce small animals of this class, called light weights and medium weights, but the production of a heavy weight hunter, one able to carry up to 220 pounds or over, is a more difficult matter. For this purpose we should select a large mare 1200 pounds or over with as much quality and ambition as possible, and breed her to a good big thoroughbred, one of 1200 or 1300 pounds. If we have a mare of reasonable quality to cross with a stallion of this description the results will in most cases be satisfactory. While there is a good market for the light weight saddler or hunter of good action and manners, a much longer price can be obtained for the big fellow of the same class. We may say that the larger the animal of this class is, provided, of course, that he has quality, the more money he is worth. There are many large men who enjoy an hour or two in the saddle, either on the flat or in the hunting field, and especially for the latter purpose it requires a large, strong horse to carry a man of say 220 pounds or over safely across country, and when a man of this weight, with money and hunting proclivities

sees a horse that has the necessary weight, ambition and manners to perform well under such circumstances, he will pay a long price to secure him. Then again, this horse can be used also in the carriage with a fair amount of satisfaction. Of course a first-class saddler or hunter has not carriage action, but for the man who likes both riding and driving this is certainly the best horse. A horse with typical carriage action does not answer nearly as well for saddle purposes as a saddle horse does for harness.

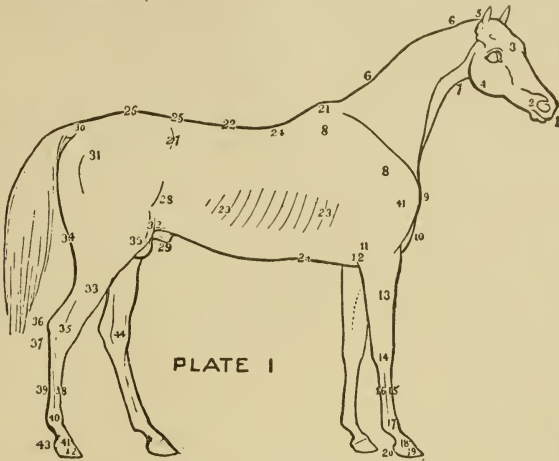
XV. Cobs.

A salable cob is a little chunky fellow with extreme action and beauty. He cannot be produced with any degree of certainty. He is sired by the various classes of light horses out of ordinary mares. His production in most cases can be explained by the action of some of the aforementioned laws of breeding. While a good animal of this class sells for a good price I do not think it would be well for any breeder to try to produce him.

XVI. Roadsters.

A good and salable gentleman's roadster is not necessarily a racehorse. In that it is seldom that a racehorse makes a satisfactory roadster. A gentleman's roadster should be of fair size, 15 1-2 to 16 hands, of good and graceful conformation, good color, and a stylish walking fellow, free driver, capable of traveling at the rate of twelve miles an hour or faster and keeping that clip up for several hours. He must have good action, both fore and aft. Must not require boots or scalpers to prevent him injuring himself, and may either trot or pace. He is, with rare exceptions, sired by the standard-bred, but can be sired out of a road mare by any of the lighter breeds of sires. In order to produce him with any degree of certainty we require a good sized mare with trotting blood and good individuality to mate with the big, clever-looking, trotting-bred stallion, with good action and at least a fair amount of speed. Small animals of this class may be able to go the distance on a good road hitched to a light rig at the required speed but my idea of a gentleman's roadster is an animal that has sufficient size and strength, combined with speed, to enable him to draw two in a buggy over heavy roads. Unfortunately there are too many roadster-bred horses in the country that are so small that even though they may be tolerably speedy, if not fast enough for racing purposes, have really no market value. Therefore, in breeding roadsters for the market we should be careful to produce animals of fair size as well as speed. Such animals can be produced if we are careful in the selection of the parents.

Any of the lighter breeds of horses mentioned are very serviceable on the ordinary farm, and can be made to earn their own living from three years old until marketable, say at four or five years.



XVII. Points of the Horse.

Head.

1. Muzzle.
2. Nostril.
3. Forehead.
4. Jaw.
5. Poll.

Neck.

- 6, 6. Crest.
7. Throple or wind-pipe.

Fore quarter.

- 8, 8. Shoulder-blade.
9. Point of shoulder.
10. Bosom or breast.
- 11, 11. True arm.
12. Elbow.
13. Forearm (arm).
14. Knee.
15. Cannon-bone.
16. Back sinew.
17. Fetlock or pastern joint.
18. Coronet.
19. Hoof or foot.
20. Heel.

Body or Middlepiece.

21. Withers.

22. Back.

- 23, 23. Ribs (forming together the barre. or chest).

24. The circumference of the chest at this point, called the girth.

25. The loins.

26. The croup.

27. The hip.

28. The flank.

29. The sheath.

30. The root of the dock or tail.

The hind quarter.

31. The hip-joint, whirlbone or round.

32. The stifle joint.

- 33, 33. Lower thigh or gaskin.

34. The quarters, haunch or upper thigh

35. The hock.

36. The point of the hock.

37. The curb-place.

38. The cannon-bone.

39. The back sinew.

40. Pastern or fetlock joint.

41. Coronet.

42. Foot or hoof.

43. Heel.

44. Spavin-place.

XVIII. The External Conformation of the Horse.

We will now give tables of what we consider the desirable points in the different classes of horses, making use of as few words as possible, in order to make our meaning clear. The plate and table on the foregoing page explains the position of the different points.

XIX. Conformation of the Heavy Draft Stallion.

Head.—Ear somewhat short, but pointed; forehead broad and rather flat; nasal bone straight; eye full, prominent and mild; muzzle small; muscle of cheek well developed; lips firm; mouth of medium size.

Neck.—Of medium length, deep where it joins the body, being continuous with withers without any line of demarcation; crest well arched, broad and strong, but not so heavy as to turn to either side; whole neck well and prominently muscled, and surmounted by a good full mane.

Withers.—In line with posterior part of the upper border of neck; rather broad and well muscled; back straight, not too long; loins broad and well muscled.

Croup.—Well and prominently muscled, not too drooping; tail well carried and full haired.

Chest.—Ribs long and well sprung; breast broad, full and prominently muscled.

Shoulder.—Moderately upright and well muscled, the muscles covering the blade thoroughly developed.

Elbow.—Strong and muscular, turning neither in nor out, but fitting closely to the chest.

Forearm.—Large and well covered with prominent muscles.

Knee.—Well developed, broad from side to side and deep from before backwards; straight, neither bending forwards (called kneespring) nor backwards (called calf knee).

Knee to Foot.—Cannon-bone, broad and flat with an absence of beefiness; in Clydesdales and Shires, should be well feathered with straight and not too coarse hair on the posterior border, especially in the region of the fetlock; in other breeds of draft horses the same amount of long hair is not present; back tendons hard and prominent and not too much tied in below knee; pasterns short, strong and tolerably upright.

Foot.—Of medium size, rather round, with good strong wall, not flat; heels full and round and not too deep; frog well developed; must not turn toes either in or out; must stand straight.

Haunch.—Heavily muscled; thick through ham; hind quarters broad and well muscled.

Stifle.—Strong and well muscled.

Gaskin.—Muscles strong and prominent; bone large and substantial.

Hock.—Large and strong and well developed in all directions; point well developed, posterior border straight, and the joint free from puffiness.

Hock to Foot.—Cannon-bone and feathering same as the fore, tendons well marked and must not have a pinched or tied in appearance below joint, skin lying close to bone and tendons; an absence of beefiness; pasterns short, strong and tolerably upright.

Foot.—Smaller, narrower and more concave sole than in front foot; frog well developed.

Color.—Bay, chestnut, black, brown, roan, with reasonable modifications.

Skin.—Soft, mellow, loose, not like parchment.

Temperament.—Energetic, docile, not nervous.

Style and Action.—General appearance attractive, movement firm, smart and elastic, especially to walk.

Weight.—1600 pounds upwards.

Height.—16 to 17 hands.

XX. Conformation of Draft Mare or Gelding.

Head.—Not so masculine-looking as the stallion, ear rather short but pointed, forehead broad, nasal bones straight, eye prominent and mild, muscles of cheek well developed, lips firm, mouth of medium size.

Neck.—Of medium length, deep where it joins the body, well muscled; crest high and hard, but not as much developed as in the stallion; good mane.

Withers.—In line with superior border of neck, thick and strong, back short and straight; loins broad.

Croup.—Well muscled, not too drooping; tail well carried and full haired.

Chest.—Ribs long and well sprung; barrel tolerably round and close to the ground; breast broad, full and well and prominently muscled.

Shoulder.—Moderately upright; well covered with well developed, hard muscles, the part against which the collar presses well defined, muscles covering the blade well developed.

Elbow.—Well developed and fitting close to body.

Forearm.—Large and well muscled.

Knee.—Large and strong in every direction, straight.

Knee to Foot.—Not too much tied in below knee; cannon-bone flat and clean; tendons well marked and strong, may be well feathered, an absence of beefiness; pasterns short, strong and tolerably upright.

Foot.—Strong, tolerably round, sole not flat, frog prominent and full, heels full and round and not too deep.

Haunch.—Well muscled, thick through ham, quarters broad and strong.

Stifle.—Large and well developed.

Gaskin.—Muscles strong and bone substantial.

Hock.—Strong and well developed in all directions, point well developed, posterior border straight, free from puffiness.

Hock to Foot.—Hind cannon broad and flat, not tied in below joint, tendons well developed, an absence of beefiness, skin lying close to bone and tendon, may be well feathered by straight and rather fine hair, pasterns, short, strong and tolerably upright.

Foot.—Smaller and narrower with more concave sole than in front, frog prominent and well developed.

Color.—Bay, black, brown, chestnut, roan, with reasonable modifications.

Skin.—Soft, mellow, loose, not like parchment.

Temperament.—Docile but energetic, not nervous.

Style and Action.—General appearance attractive, action free, firm and easy, all feet being brought forward in a straight line and firmly planted; walking action especially must be good, not slow or clumsy.

Weight.—1500 pounds upwards.

Height.—15 $\frac{3}{4}$ to 17 hands.

XXI. Conformation of Coach Stallion.

Head.—Ear of medium size, fine and approaching each other at tips when pointed forward, forehead broad and flat, bones of nose straight in front and slightly dished on the lateral surfaces, muscles of cheek well developed, eye prominent, nostrils large and flexible, mouth of medium depth.

Neck.—Rather long, head gracefully attached and carried well up, crest well developed and nicely arched.

Withers.—Well developed, not too thick, back straight and rather short, loins broad and strong.

Croup.—Only moderately sloping, dock coming out high up, tail full haired and carried straight and well out from the body.

Chest.—Ribs long and well sprung, deep from above downwards; breast full and well muscled.

Shoulder.—Rather oblique and well muscled.

Elbow.—Well developed and fitting closely to ribs.

Forearm.—Strong, muscles well developed and standing out boldly,

Knee.—Broad from side to side in front, deep from before backwards, upright.

Knee to Foot.—Cannon-bone broad and flat, tendons well developed

and prominent, skin lying close to bone and tendons; an absence of beefiness, not too much tied in below knee, an absence of long hair; pasterns strong, of medium length and obliquity; all joints strong and well developed.

Foot.—Wall moderately deep and strong, of medium size and tolerably round, sole concave, frog well developed, heels broad and strong and not too deep; must not turn toes either in or out.

Haunch.—Muscles well developed and standing out boldly, hind quarters broad and strong.

Stifle.—Well developed and strong.

Gaskin.—Strong and well developed, muscles standing out boldly and well defined.

Hock.—Large and strong in all directions, point well developed, posterior border straight; an absence of coarseness and puffiness.

Hock to Foot.—Hind cannons clean, broader and flatter than the fore ones, tendons standing boldly out and well defined, an absence from beefiness, skin lying close to bone and tendon; must not have a tied in or pinched appearance below hock, an absence of long hair, pasterns strong, of medium length and obliquity.

Foot.—Smaller and narrower, with more concavity in sole than the fore one, frog well developed, heels round and strong and not too deep.

Color.—Bay, brown, black, chestnut, roan, gray, with reasonable modifications. (In this class a good horse may be a bad color.)

Skin.—Soft, mellow, loose, not like parchment,

Temperament.—Energetic, docile, not sluggish, free from nervousness.

Style and Action.—Free and elastic, attractive, knee well bent, fore feet lifted well off ground when in motion and being brought straight forward, neither paddling or rooling, stride long, with an absence of the tarrying action sometimes seen, hocks well bent and hind feet lifted well up, not going wide or yet close enough to strike opposite ankle.

Weight.—1100 to 1400 pounds.

Height.—15 $\frac{3}{4}$ to 16 $\frac{3}{4}$ hands.

XXII. Conformation of Carriage Mare or Gelding.

Head.—The same general outline as the coach stallion, with an absence of the masculine appearance.

Neck.—Clean cut, an absence of masculine appearance, rather long, head nicely attached and carried well up, crest well developed and wiry and nicely arched, windpipe standing in relief from the muscles, the jugular gutter well defined.

Withers.—More prominent and not so thick as the stallion; back straight and rather short, loins broad and strong.

Croup.—Not too sloping, dock coming out well up, tail well haired, carried straight and well out from the body.

Chest.—Ribs long and well sprung, deep from above downwards.

Shoulders.—Moderately sloping, well muscled over shoulder-blade.

Elbow.—Well developed and lying close to chest.

Forearm.—Strong, muscles well developed, well defined and standing boldly out.

Knee.—Large and strong in all directions, upright; should be critically examined for malformations.

Knee to Foot.—Cannon-bone strong, broad and flat, tendons well defined and standing boldly out, and not apparently too much tied in below the knee, and absence of beefiness and long hair, skin lying close to bone and tendon, pastern strong, of medium length and obliquity.

Foot.—Of medium size and tolerably round, horn thick, strong and with smooth surface, sole rather concave, frog full and well developed, heels broad and strong and not too high, must not turn toes either in or out.

Haunch.—Muscles strong and standing boldly out, well defined, hind quarters broad and strong.

Stifle.—Strong and well muscled.

Gaskin.—Strong, muscles well defined, large and standing boldly out.

Hock.—Strong and well developed in all directions, an absence of coarseness and puffiness, point of hock well developed and posterior border straight.

Hock to Foot.—Hind cannons broad, strong and clean, tendons strong, well defined and standing boldly out, not tied in below joint, an absence of beefiness, skin lying close to bone and tendon, limb flatter than the front one; pasterns strong, of medium length and obliquity.

Foot.—Smaller and narrower than in front, sole more concave, frog large and strong, heels strong and not too deep.

Color.—Bay brown, black, chestnut, roan, gray, with reasonable modifications. (A good horse of this class may be a bad color.)

Skin.—Soft, mellow, not like parchment.

Temperament.—Docile, lively, energetic, not sluggish, free from nervousness.

Style and Action.—General appearance attractive and stylish, knees well bent and fore feet lifted high from the ground when in motion, being brought forward in a straight line, with neither a paddling nor rolling motion, and not allowing the foot to tarry in the air, but extending it promptly and boldly forward with a long stride, hocks well bent

and hind feet lifted gracefully and quickly from the ground, not going wide, nor yet close enough to interfere; must not forge.

Weight.—1000 to 1300 pounds.

Height.—15½ to 16½ hands.

XXIII. Conformation of the Hackney Stallion.

Head.—Of medium size, slightly dished laterally, wide between the eyes, eyes full, prominent and mild, but lively in appearance, ears small, fine, turned inwards at tips when pointed forward, set wide apart, nostrils of medium size but very flexible, mouth small, muzzle fine, jaws not heavy but wide apart, cheeks flat with well developed muscles, but not too fleshy, head carried fairly high, nose drawn slightly inwards towards breast.

Neck.—Of medium length, crest well developed, hard and whipcordy, well arched, clean, but not too fine at throat, wide and muscular at shoulder.

Withers.—High but not sharp, back short with rise at loin, which should be broad, full and muscular.

Croup.—Slightly drooping, long, not steep, tail set on rather high, well haired and carried straight and well out from the body.

Chest.—Ribs long and well sprung.

Breast.—Tolerably wide and well muscled.

Shoulder.—Oblique, deep and well muscled.

Elbow.—Well muscled and strong, fitting close to chest

Forearm.—Long, well and prominently muscled.

Knee.—Broad and deep in all directions, straight, with an absence of malformations.

Knee to Foot.—Cannon-bone short, strong and flat, with an absence of beefiness, back tendons standing out prominently, no coarse hair on posterior border, tendons not too much tied in below knee, pasterns strong and of medium length and obliquity.

Foot.—Of medium size, round and strong, tolerably concave sole, well developed frog, strong and broad heels, not too high, must not turn toes either in or out.

Haunch.—Heavy muscled, thick through ham, hindquarters broad and strong.

Stifle.—Strong and well muscled.

Gaskin.—Well and prominently muscled and strong, hamstring standing boldly out and well let down at hock.

Hock.—Strong, clean, rather short, an absence of coarseness, well developed in all points, no puffiness, point well marked, posterior border straight.

Hock to Foot.—Cannon rather short, strong and flat, an absence of beefiness, back tendons standing out prominently and not tied in below joint, skin lying closely to bone and tendon, without long hairs on posterior border, pastern strong, of medium length and rather oblique.

Foot.—Smaller than fore foot, sole more concave, frog well developed, heels broad, strong and not too high.

Skin.—Soft, mellow, loose, not like parchment.

Color.—Bay, brown, black, chestnut, roan, gray, with reasonable modifications. (A good horse of this class may be an undesirable color.)

Action.—Knee and hock action high, with considerable extension, stride, grace and speed, must not paddle or rool fore feet nor allow them to tarry in the air, but fetch them up and forward in a straight line, with grace, promptness and style; hind feet must be lifted promptly and high, not with a sprawling action nor yet going close enough to interfere, but being brought forward in a straight line, with a good long stride and firmly planted.

Temperament.—Docile but very energetic, free from nervousness, general appearance attractive and symmetrical.

Weight.—950 to 1200 pounds.

Height.—15 to 16 hands.

The conformation of the Hockney mare or gelding the same as above, with the absence of the masculine appearance of head, crest and general physiognomy.

XXIV. Conformation of the Standard-Bred Stallion.

Head.—Ear of medium size and pointed, eye large, prominent and of docile expression, bones of the nose straight in front and slightly dished laterally, bones of cranium nicely rounded, nostrils firm, large and readily dilated, muscles of cheek well developed, but not too heavy, mouth of medium size, lips firm, muzzle fine and tapering, branches of lower jaw well spread apart at their angles.

Neck.—Rangy with well developed crest and attached to the head in an angular sort of way, rather of the obtuse order.

Withers.—May be continuous with the superior border of the neck, well developed and not too broad, back straight and rather short, loins broad.

Croup.—Somewhat sloping with dock coming out high up, tail well haired and carried in a graceful manner.

Chest.—Deep through the girth, ribs long and well sprung with well marked angles, breast broad and well muscled.

Shoulder.—Oblique from above downwards and forwards, blade bone well covered with muscles.

Elbow.—Well muscled and lying close to chest.

Forearm.—Well developed and strong, with muscles well defined and standing boldly out.

Knee.—Straight, strong in all directions, free from malformations.

Knee to Foot.—Cannon-bone rather short, broad, flat and clean, not feathered, tendons well defined and prominent, skin lying close to bone and tendon, tendons not too much tied in below knee, an absence of beefiness, pasterns strong, of medium length and obliquity.

Foot.—Of medium size, rather round with strong wall, sole rather concave, frog large and well developed, heels broad, strong and not too deep, must not toe either in or out.

Haunch.—Muscles well developed, deep through ham, quarters broad and strong.

Stifle.—Strong and well muscled, compact.

Gaskin.—Muscles prominent and hard, hamstring prominent.

Hock.—Large and strong in all directions, all parts well developed, an absence of malformations and puffiness, point well developed and posterior border straight.

Hock to Foot.—Cannon-bone rather short, broader and flatter than in front, little or no feathering, an absence of beefiness, tendons standing out prominently and well defined and not tied in below joint, skin lying close to bone and tendon, fetlock joint large and strong, pasterns strong, of medium length and obliquity.

Foot.—Smaller and not so round as in front, sole more concave, frog well developed, heels strong and not too deep.

Color.—Bay, brown, black, chestnut, roan, gray, with reasonable modifications.

Skin.—Soft, mellow, loose, not like parchment.

Temperament.—Docile, kind, prompt, energetic, not nervous.

Style and Action.—Free and elastic, perfect in trotting gait, a good walker, must not paddle or rool in front, may go wide behind, may either trot or pace, and must go level without hitting himself any place, and be able to go fast.

Weight.—950 to 1200 pounds, or even more.

Height.—15 to 16½ hands.

The mare and gelding of this class may be of the same general type as the stallion, but not so masculine looking; the neck, withers and general physiognomy being the points which contribute most to the more effeminate appearance of these animals. The neck should be more delicate and cleaner cut, the crest not so well developed, the withers more pronounced, not so thick through and through at the upper part, and

there should be a line of a demarcation between withers and neck, the general physiognomy milder and gentler and less impetuous.

XXV. Conformation of the Thoroughbred Stallion.

Head.—Ears fine, not too long, approaching each other at the tips when thrown forward; cranium broad and nicely rounded, forehead flat and broad, eyes wide apart, prominent, large and bold in expression, nasal bones straight in front but slightly dished on lateral surfaces, nostrils firm, large and flexible, of large capacity when the animal is excited, lips firm, mouth of medium size, muzzle small and tapering, cheeks well but not too heavily clothed with hard, well developed muscles, branches of lower jaw well spread apart at their angles.

Neck.—Clean cut and rangy, crest well developed and whipcordy but not so heavy as in other classes, head attached to neck in graceful, angular manner, rather of the obtuse order, jugular gutter well marked.

Withers.—Well developed, high and not too wide, unless animal be fat there should be a line of demarcation where the neck leaves off and the withers commence, back straight and rather short, loins broad and strong.

Croup.—Rather long and slightly sloping with dock coming out high up, tail carried straight, well out from the body in an arched and graceful manner.

Chest.—Somewhat cone-shaped with good, broad base behind, apex between fore legs, where the animal may be narrower in proportion than other breeds, the cavity should be deep from above downwards especially at the girth, ribs long, well sprung, with well marked angles, breast muscles well defined and prominent, but not too wide.

Shoulder.—Oblique from above downward and forward, the blade bone being well covered with hard, well developed muscles.

Elbow.—Well muscled and lying close to chest.

Forearm.—Long, well developed and strong, well clothed with hard, well developed muscles, having grooves of demarcation between them, showing the outlines of each individual muscle.

Knee.—Clean, straight, large and strong in all directions, the bone forming the back part somewhat prominent, an absence of malformations.

Knee to Foot.—Cannons short, broad, flat and clean, tendons standing out plainly, hard and whipcordy, lines of demarkation between tendons and ligament and between ligament and bone, an absence of beefiness and long hair, skin lying close to bone and tendon, tendons not too much pinched below knee, fetlock joint well developed and strong, pasterns somewhat lengthy and of medium obliquity.

Foot.—Rather smaller in proportion than in other breeds, round, strong and tolerably deep wall, sole concave, frog well developed, heels full and not too deep, must not turn toes in or out when standing.

Haunch.—Well clothed with hard, well developed muscles, showing grooves of demarcation between them, thick through ham, quarters broad and strong.

Stifle.—Strong and well muscled, not bulky.

Gaskin.—Clothed with hard muscles standing individually boldly out, hamstring strong, prominent and whipeordy.

Hock.—Deep and strong in all directions, all points well developed but not rough, an absence of malformations or puffiness, point very well developed, straight on posterior border, the whole joint clean and hard and of an angular order.

Hock to Foot.—Cannons short, wider and flatter than fore ones, clean, no beefiness, no feathering, tendons well marked individually and must not have a pinched appearance below joint, but very gradually taper in width from hock to fetlock, skin lying close to bone and tendon, fetlock joints large, clean and strong, pasterns rather lengthy, strong and of medium obliquity.

Foot.—Smaller, not so round as the front ones, sole more concave, frog well developed, heels strong and not too deep.

Color.—Bay, brown, chestnut, gray, black with reasonable modifications.

Skin.—Soft, mellow, loose, not like parchment, hair forming coat fine, silky and straight, hairs of mane and tail, although coarse, must be straight and soft in comparison with other breeds.

Temperament.—Mild, not vicious, energetic, inclined to be impetuous, not too nervous.

Action.—Prompt, free and elastic, not too much knee and hock action, but going rather close to the ground, especially in the canter or gallop, must not paddle or rool fore feet, nor go close enough behind to interfere, good walker.

Weight.—Say 1050 to 1300 pounds.

Height.—Say 15½ to 16½ hands.

XXVI. Conformation of the Thoroughbred Gelding or Mare.

Head.—Rather small, ear fine and pointed, not too long, cranium nicely rounded, forehead flat and broad, eye large and prominent and gentle in expression, nasal bones straight in front and slightly dished laterally, nostrils large, firm and flexible, lips firm, mouth of medium depth, muzzle tapering and small, cheek clothed with hard, well

developed muscles, branches of lower jaw well spread apart at their angles.

Neck.—Clean cut and rangy, crest well developed and whipcordy, but not so full as in the stallion, the point where the neck leaves off to be well marked in front of the withers, jugular gutter well marked, windpipe standing out independently of the rest of the neck, attachments of head to neck well marked and to be rather angular, of the obtuse order.

Withers.—Well developed and high, forming a well marked prominence over the shoulder, the top of which should not be thick; the back, springing from the posterior aspect of the withers, should be straight and short, loins broad and well muscled.

Croup.—Rather long and somewhat sloping, with dock coming out well up, tail carried straight, well out from the body and in a gracefully arched manner.

Chest.—Somewhat cone-shaped with good broad base behind, apex between shoulders rather narrow, but deep through the girth, ribs long and well sprung with well-marked angles.

Shoulder.—Coming from high, sharp withers, should be oblique from above downward, blade clothed with hard muscles, well formed but not bulky.

Elbow.—Well muscled and lying close to chest.

Forearm.—Well developed and strong, with muscles standing boldly out and well defined, marked from each other by grooves.

Knee, knee to foot, foot, haunch, stifle, gaskin, hock, hock to foot, foot, color and skin, same as stallion.

Temperament.—More docile than the stallion, but still very energetic.

Action.—Rather lighter on foot than the stallion; in other respects the same.

Weight.—Say 850 to 1250 pounds.

Height.—Say 15 to 16½ hands.

The saddle horse may be of the same general type as the thoroughbred (mare or gelding), but if not thoroughbred will not have as much quality. Must have good manners, a mouth that responds readily to the hand of his rider. Graceful and elastic actions in all paces being essential.

We will now give a few illustrations showing some of the desirable and undesirable points of conformation of the horse. From these illustrations the breeder will be able to inform himself as to the various features and traits of disposition; also the correct and incorrect position of the limbs, feet, etc.

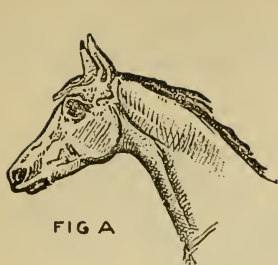


FIG A

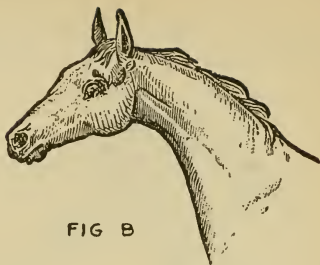


FIG B

Fig. A.—Shows a very good head of a thoroughbred. The general expression and attitude denote intelligence, ambition and docility. The crest is nicely arched, but not bulky; head gracefully attached and well carried; all muscles and the jugular gutter well marked.

Fig. B.—Shows a good head and neck of a trotting or road horse.

Fig. C.—Shows a good head, but the neck is very deficient, being too long and thin, and much too fine where attached to head. Necks of this description are usually accompanied by a small head, with little space between the angles of the lower jaw. Consequently, the space occupied by the larynx (that cartilaginous box at the commencement of the windpipe) is limited, not allowing sufficient room for expansion when large quantities of air are taken into the lungs during violent exercise, and as a consequence the animal is very liable to become a roarer.

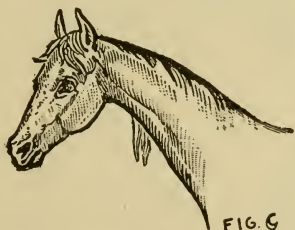


FIG C

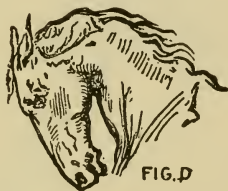


FIG D

Fig. D.—Represents an ill-formed head and neck. The neck is attached to the head in an ill-manner. The mouth or nose is turned in too much towards the breast, which renders the animal practically uncontrollable unless a check rein be used to keep his nose out. The eye, ear and general expression denote stubbornness and ill-temper. For purposes of draft, the neck should be very much thicker and more heavily muscled than in light horses, but nevertheless the head should be properly attached.

Fig. E.—Shows a shapely, muscular neck for draft, rather thick at the attachment to the head, but at the same time well proportioned.

The head is broad, strong, and rather large at the muzzle, not a serious fault even with driving horses, although a fine muzzle looks more attrac-

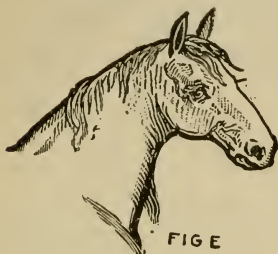


FIG E

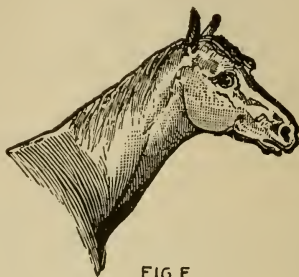


FIG F

ive, and with large flexible nostrils this conformation may be very well marked.

Fig. F.—Shows a badly formed neck and shoulder, and an ill-proportioned, badly formed head.

Fig. G.—Shows an ewe-necked vicious brute, the head set on too high, the dished face, shape and position of ears, wild expression of the

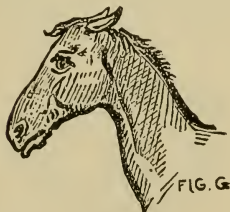


FIG. G



FIG. H.

eyes and position of lips denote a vicious and dangerous disposition. The Roman nose also denotes stubbornness.

Fig. H.—Shows a strong, muscular neck and head, but at the same time the position of the ear, the eyes high in the head with a surly expression, the Roman nose, thick neck and jaw denote a treacherous and unsafe horse. Such a horse, if kept properly under control by a competent driver, may be fairly well managed, but in careless or incompetent hands is liable to become vicious and intractable at any time.

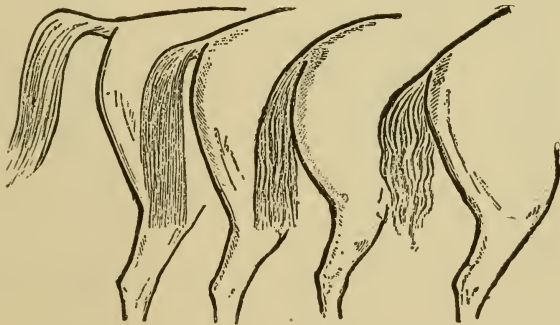
Plate 2.—Shows different conformations of the back. The back should be straight and of medium length; the straighter and shorter it is the more it denotes strength, while the longer it is, and especially if it also be hollow, the more indicative it is of weakness. However, very

short backs are not desirable, as a certain amount of length is essential in order that the animal may have action and a certain amount of speed.



GOOD AND BAD BACK.

Though shortness of the back indicates strength, particularly as regards carrying weight, we must remember that too much must not be sacrificed for any one point, and a horse with a very short back is apt to overreach (forge) unless his shoulders be very oblique. Backs which are in their original formation hollow, invariably become more so under the influence of weight and age. This is particularly noticeable in stallions that are used in the stud. In fact, all backs, though originally straight, become more or less hollow with age. This effect is partly due



GOOD AND BAD HINDQUARTERS.

to the ordinary mechanical action of weight on a given line, and partly to wasting away of the muscles in old age. A horse with what is called

a roach back is usually rough and uneven in his paces and inclined to forge. The formation is favorable to strength, and unless the peculiarity be very marked, especially if the quarters are good, and the shoulder strong and oblique, he will generally be a serviceable animal.

In the illustration the top figure shows a very straight back and croup—with the dock coming out very high up. The central figure a hollow back and drooping croup, and the lower figure a roach back.

Plate 3.—The hair of the tail usually indicates the breeding of a horse to a certain extent. That of well-bred horses is generally straight and fine. A thick, coarse or curly quality of hair usually denotes want of breeding. The tail should be carried firm, straight and well away from the hind quarters. It should be set on almost in a line with the back bone. In the coarsely bred animal the tail is usually set on low down, possesses little muscular power, clings to the quarters, and altogether looks mean. Fine, curly hair is occasionally, though seldom, seen even in the tails of thoroughbreds.

In the illustration the figure on the left shows a tail the dock of which comes out high up, and the tail is well and gracefully carried. The second figure shows the dock coming out lower down from drooping croup, and tail not so well carried. In the next figure this is more marked, the animal hugging the tail, while the figure to the right shows a tail with coarse, wavy hair coming out very low down from a very sloping croup, and meanly carried, the hams cut away and weak, and altogether the parts of a mean-looking and generally unserviceable animal.

Plate 6.—Let us now view the position of the hind legs, viewed from the side, the horse standing.

Fig. I.—Shows the commonly received idea of the correct position, but the whole limb is placed rather too far back, and it is rather too near the perpendicular from point of hock to fetlock pad.

Fig. J.—Shows a more correct position, the limb is more under the center of gravity than Fig. I, the hock not quite so far back and there is a slight deviation forward from hock to fetlock.

Fig. K.—Shows a horse standing too straight, hamstring not well developed, and rather a deviation backwards from point of hock to fetlock, altogether a rather weak limb.

Fig. L.—Shows the limbs too much bent, sickle shaped, giving the horse a mean appearance, and at the same time the hock is not strong, and disease, especially curb, is easily produced.

Fig. M.—Shows the leg from hock down placed too far behind; this conformation indicates weakness and is usually associated with defective action.

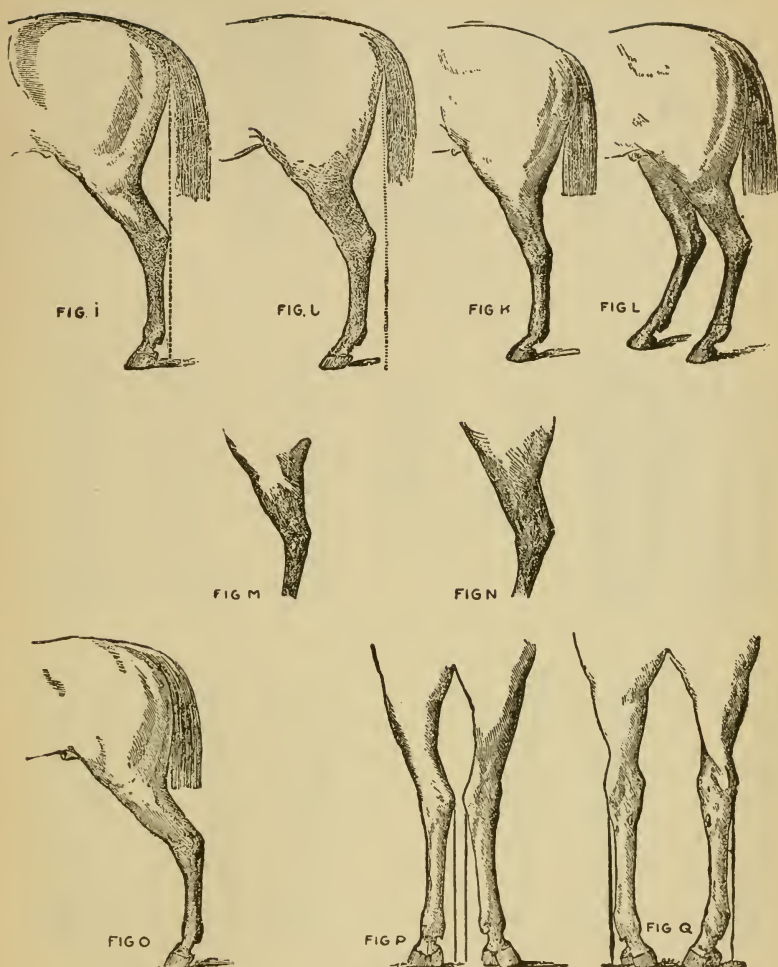
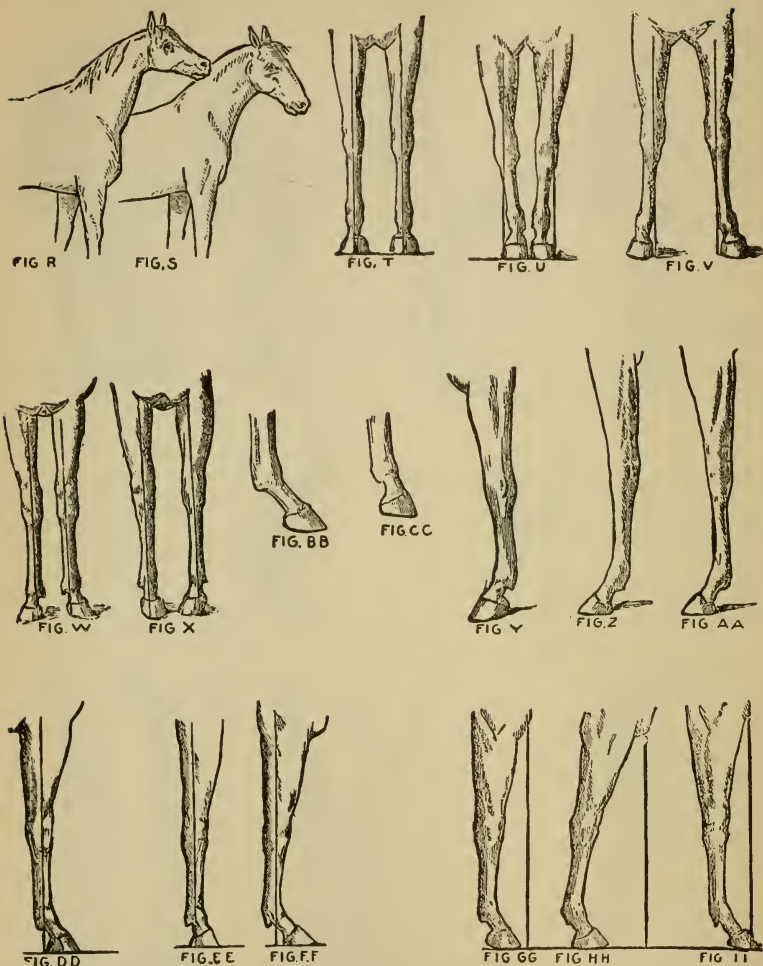


Fig. N.—Shows the point of the hock poorly developed, the hock is not “well let down,” always accompanied by poor hock action.

Fig. O.—Shows the opposite and desirable conformation, the point of hock well developed. The hock is “well let down.” This conformation indicates good leverage, and is usually accompanied by good



action. In this figure the hock alone must be considered, not its position in respect to the body.

Coming now to the rear view of the hind legs.

Fig. P.—Shows the points of the hocks too close together (cow hocked), with a lateral deviation outwards of the limbs to the feet. He points the feet outwards, is splayfooted. The points of the hocks

should not approach each other in this manner, but should stand squarely, turning neither outwards nor inwards, and the limbs should maintain this position down to the foot, which also should be planted straight forwards and backwards.

Fig. Q.—Shows the hocks too far apart, the points turned outwards, with a lateral deviation inwards from hock to foot, the toes turned inwards (parrot toed).

Coming to the fore quarters the illustrations will give a good idea of shape, obliquity of shoulder, setting on of the neck and carriage of the head.

Fig. R.—Shows good conformation of head, neck and shoulders.

Fig. S.—Shows shoulders too upright, neck too short and thick, throat thick and heavy, ears and eyes badly placed, and general expression bad.

Fig. T.—Shows correct position of fore limb and foot.

Fig. U.—Shows feet too close together; the horse is bandy-legged.

Fig. V.—The feet are too wide apart; the horse straddles.

Fig. W.—Shows the toes turned out; when traveling he will rool his toes inward, and in all probability strike the opposite limb some place between the pastern and knee, or even above the knee, according to the height of action. This is called speedy stroke, and is very undesirable, as it necessitates the wearing of boots for protection, and is liable to cause him to stumble.

Fig. X.—Shows the contrary conformation; the toes turn inwards, giving the animal a waddling action, which has a very clumsy and unattractive appearance. There is considerable waste motion.

Fig. Y.—Gives a side view of fore leg. The position is correct, the knee large, strong and straight, neither bending forwards, "knee spring," nor backwards, "calf-knee."

Fig. Z.—Shows the knee bending backwards, "calf or buck-kneed." This conformation is well marked, causes undue strain on back ligaments and tendons.

Fig. AA.—Shows a small, weak knee, with the tendons tied in or pinched below the joint.

Fig. BB.—Shows the pastern too long and weak.

Fig. CC.—Shows the pastern too short; there is a want of flexibility; the action will be stiff and stilty.

Fig. DD.—Shows a good limb in a correct position.

Fig. EE.—Shows the pastern too short and upright; the action will be stiff and stilty, especially for saddle purposes. The concussion is so great that parts are very liable to disease.

Fig. FF.—Shows the opposite conformation; the pastern is too long

and oblique, the strain consequently undue upon the back tendons, which, as a consequence, are liable to disease.

Fig. GG.—Shows the correct position of foot in relation to the breast.

Fig. III.—Shows the foot planted too far back.

Fig. II.—Shows a weak knee and fetlock. The limb is straight, but out of proper position on account of weakness.

The reader who carefully examines these illustrations should be a fairly good judge of how a horse should look, either from a front, rear or side view, both as to the body and limbs.

DAIRYING AND DAIRY BUILDINGS.

By Prof. H. H. Dean, B. S. A., Professor of Dairy Husbandry, Ontario Agricultural College, Guelph, Ontario.

I. THE DAIRY COW.—II. FEED.—III. BUTTER MAKING.—IV. SPECIAL POINTS ON BUTTER MAKING.—V. CREAMERIES.—VI. CHEDDAR CHEESE.—VII. SALTING THE CURD.—VIII. CURING THE CHEESE.—IX. FARM CHEESE.—X. DAIRY BUILDINGS.—XI. TOWN AND CITY MILK AND CREAM TRADE.—XII. CONDENSED MILK.—XIII. IMITATION BUTTER.—XIV. THE TESTING OF MILK.—XV. MARKETING DAIRY PRODUCE.

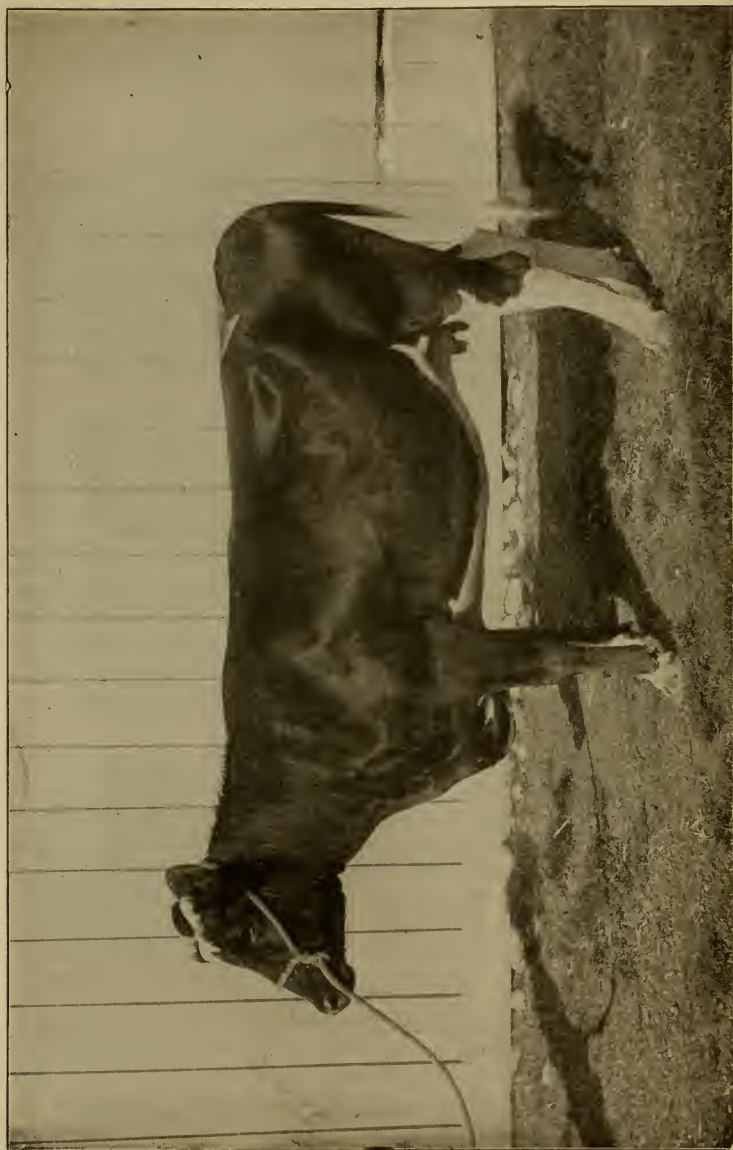
The dairy interests of the North American people are very large. No branch of agriculture has been so profitable as dairying. The dairy cow is the queen of all animals kept on the farm, when properly fed and when cared for in the best manner.

There are two classes of dairymen as regards method of manufacturing their product, viz.: private and co-operative. The former are the older, but the latter are more extensive in their operations. Co-operative cheese factory dairies began in 1851, in the State of New York. The chief advantages of co-operation in the dairy are a more uniformly high quality of cheese and butter, which sells for a higher price than average private dairy goods, and the fact that it relieves the farmer's wife of a great deal of drudgery.

Co-operative factories are managed on one of two plans—joint stock company or private enterprise. In the first, the factory, plant, etc., are owned by the farmers that manage the business, as well as owning and milking the cows. When properly managed, they are the most successful factories. Private enterprise factories are chiefly owned by one person, who provides factory and plant and manufactures the product, as a rule, for a certain rate per pound. This plan usually insures good business management, and the system is well liked in many sections.

I. The Dairy Cow.

A good cow is the foundation of all successful dairying. Good cows are found in all breeds and among those of no particular breeding; but they are more common among what are known as the dairy breeds, chief of which in America are Holstein, Jersey, Ayrshire, Guernsey, Canadian, and some strains of the Short-Horn.



HOLSTEIN COW, "MARGARET CORNELIUS."

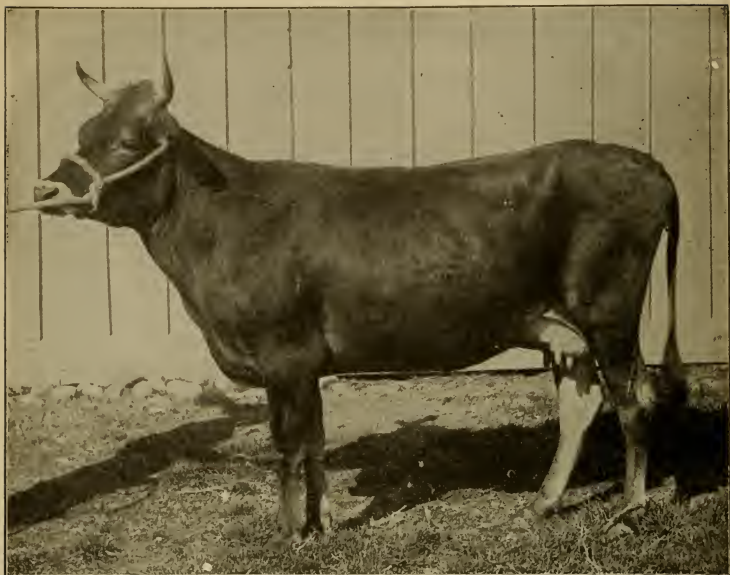
In building up a dairy herd, select the best cows of the breed, grade or native most suitable for the conditions under which they are to be used. Breed these cows to pure bred males of the same breed as the cows are, where pure breeds are kept, and breed the grades and natives to pure bred males of whatever breed is thought to be best. Rear the heifer calves on whole milk for about two weeks, then change gradually to warm, sweet skim milk to which has been added a small amount of bran and ground oats when young. Afterwards feed the meal dry and give clover hay, grass, and in winter give pulped or sliced roots. Keep the calves warm, dry and clean. The heifers should commence milking when between two and three years old. Weigh the milk from each cow, and test for fat at least once a month. Have a standard of not less than 6000 pounds of milk or 250 pounds of butter per year for each cow, and sell all which do not come up to this standard at the end of their second milking period. In this way a creditable dairy herd may be built up in a few years.

II. Feed.

Grass is nature's food for milk production, and where this is obtainable in abundance no other feed is necessary. Give plenty of pure water, and allow cows access to salt at all times. Lucerne clover is an excellent soiling crop, as also are green peas and oats and corn. Corn silage is a valuable summer food as well as a good food for winter. In winter give the cow all the mixed corn silage and cut clover hay which she will eat, together with mangels, and six to eight pounds of meal for each pound of fat produced in the milk, or for every twenty-five to thirty-five pounds of milk which she gives. The meal may consist of one-half bran and the other half peas and oats. Gluten feed, cotton-seed meal, oil cake, etc., are also useful concentrates, if they can be purchased at reasonable prices and without adulteration. The subject of cow feeding and management may be summed up in: breed carefully, select wisely, care for kindly, feed liberally, milk regularly. This done, and prosperity shall attend the steps of the dairyman.

III. Butter Making.

Butter may be made in a private dairy or in a creamery. In the private dairy the milk is usually set for the cream to rise in shallow pans or deep cans, or, what is now very common, it is run through a cream separator immediately after being milked. To obtain the best results with shallow pans, set as soon as possible after milking in pans about four inches deep. Keep in a clean, cool place, such as a cellar or milk-house, and skim at the end of twenty-four or forty-eight hours. Loosen the cream from the edge of the pan with a thin-bladed knife, and allow



JERSEY LILY.

Ontario Agricultural College. Two years old, solid color, black tongue and switch.
Her milk is excellent quality and she promises to make
a fine cow for butter making.

the cream to glide over the edge of the pan into the cream can. Do not use a perforated skimmer, as it wastes the cream. In deep setting, set in pans about eight inches in diameter and twenty inches deep. Place the cans in ice water for twelve to thirty-six hours, and skim carefully from the top or bottom. If using a separator, run the milk through as soon as milked; but if separating but once a day, heat the milk to 95° to 100° and then separate. Cool the cream to 60° as soon as it comes from the separator. Wash the machine after each time of using. The cream from pans and cans should be kept sweet until twenty-four hours before churning, when it may be warmed to about 60° to 65° , and a small amount of clean flavored sour skim-milk or buttermilk may be added to hasten and control the ripening or souring of the cream. A better way is to heat some skim-milk, to which has been added 25 per cent. of clean water, to 160° for twenty minutes, then cool to 80° to 90° and add a commercial culture. This is a safer plan than to use ordinary sour milk, buttermilk or cream. The commercial culture may be propagated

for an indefinite length of time with proper care, and need not be bought oftener than once or twice a year. The cream is ripe and ready to churn when it tastes slightly sour, is thick and glossy in appearance, and has a pleasant, ripe smell. If tested with a one-tenth normal alkaline solution, it should show five-tenths to six-tenths of one per cent. acidity. Cream may be churned in a box or barrel churn or in a combined churn, and worked at a temperature of 50° to 70°, depending upon conditions. Churn at such a temperature that the butter will come firm in twenty to forty-five minutes. Stop the churn when the butter is the size of wheat grains, and draw the buttermilk. Wash the butter once in water at 50° to 55°, and then salt in the churn or on a worker. For a farm dairy a V-shaped worker is very convenient. In the factory, rollers are used to apply pressure to the butter. The amount of salt will vary from one-half ounce to one ounce per pound of butter. Use fine, clean salt.

Work the butter once for local markets; for export or to pack, work twice, to overcome "mottles" or "streaks." For local trade, put the butter in pound prints wrapped in parchment paper. For export or



AYRSHIRE PATTI.

No. 10,741 in Canadian Ayrshire Book. Two years old. Her dam was imported from Scotland and was one of the best cows in the college herd.

cold storage, pack in square boxes holding fifty-six pounds, or in tubs holding fifty pounds. The best packages are lined with paraffine wax and heavy parchment paper. If the packages are unlined, soak in brine for three or four days, then steam and sprinkle the inside with salt before putting in the butter. Spruce is the best material for wooden butter packages. Pound the butter firmly into the package, so that it will be close and uniform when emptied.

IV. Special Points on Butter Making

(1) If coloring is used, add it to the cream before commencing to churn. Do not overcolor the butter. Commercial coloring is preferable to carrot or other home-made coloring.

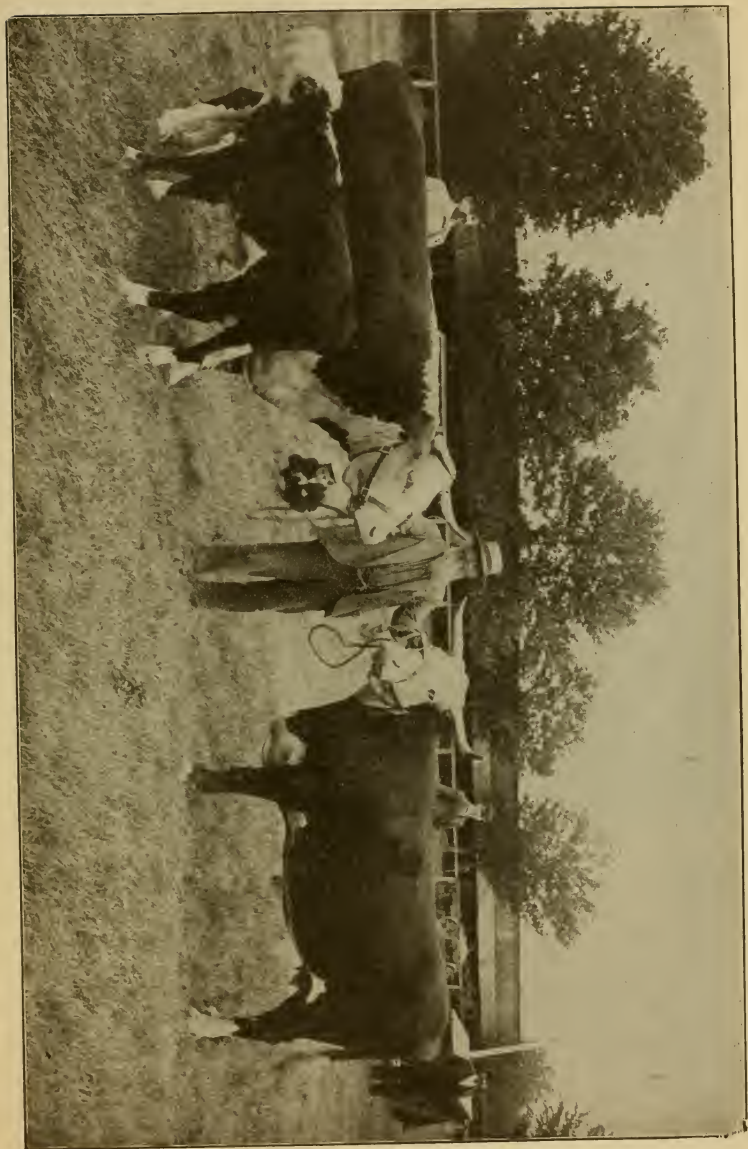
(2) Pasteurizing (*i. e.*, heating to 160°) the whole milk before running it through the separator in winter will enable the butter maker to secure a more uniform quality of butter, and butter at all times which has improved keeping quality. Sweet cream may also be Pasteurized after each time of skimming by setting the can of cream in a tub or tank of hot water at 180° and stirring until the cream reaches 160°, then cool to below 60° before adding to the cream can or crock containing cream from previous skimmings. Add about one cup of culture to the cream can in winter with the first lot of cream to get good flavor, and hold at 60°.

V. Creameries.

Creameries are of several kinds—whole milk or separator, cream gathering, and combined separator and cream gathering—usually in connection with skimming stations, at which only the cream is separated and then it is taken to a central creamery to be churned. In connection with the cream-gathering creamery, hand separators on the farm are becoming very common. This method saves the expense of hauling the whole milk to the creamery and the skim-milk back to the farm; but owing to the fact that the cream is often spoiled before it reaches the creamery, it is doubtful if this is the best plan to make a fine quality of butter. In sections where cows are not plentiful the cream-gathering plan is to be commended, but in thickly settled portions the whole milk creamery is best, because the finest quality of butter may be made if patrons cool the milk properly at the farm and it reaches the creamery sweet. The butter maker then has an opportunity to show his skill in the manufacture of high-class butter.

VI. Cheddar Cheese.

In the system of factory cheese making known as cheddar, the milk is delivered at the factory once a day—usually before 9 A. M. The proper caring for milk at the farm is a very important point in the



A GROUP OF HEREFORDS.

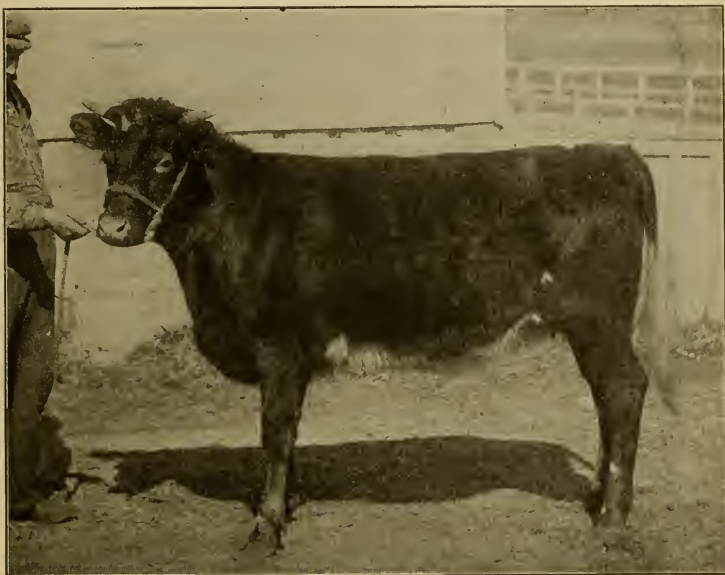
The property of Mr. Alfred Stone, Guelph, Ontario.

making of fancy cheese. The chief things to observe in the care of milk are: Have good healthy cows, fed on clean food, which does not taint the milk. (Turnips, turnip tops, rape, apples, apple pomace, brewers grains, etc., should not be fed to cows producing milk for cheese making or any other fine dairy products.) As soon as milked the milk should be strained into cans. When the cows are all milked, place the cans of milk in a tank of cold water and stir until the milk is below 70°, at which temperature it may be left for the night, except on Saturday, when it should be cooled to near 50°, if it is to be sent to the factory on Monday morning. The morning's milk should also be cooled, if possible, and should not be mixed with the evening's milk until it leaves for the factory. Be sure that the atmosphere is pure in which the milk sets over night. The cows should also be milked in a clean, pure atmosphere. After the milk reaches the factory coloring is added, as soon as the weight of milk in the vat is known, if colored cheese are made, though white or uncolored cheese are more wholesome, and there is a growing demand for uncolored cheese. The coloring commonly used is made from Annato seed, though many colors are now made from the by-products of gas manufactories.

The milk is then heated to 86° by means of steam turned under the vats of milk. When the milk is ripe, which is ascertained by means of a rennet, or an acid test, the milk is set by adding from three to five ounces of rennet extract per 1000 pounds of milk. When the curd is firm it is cut once with a horizontal knife and twice with a perpendicular knife. The curd will then be in the form of cubes from three-eighths to five-eighths of an inch in size. The curd is then gently stirred and in about ten minutes heat is applied by means of steam. The curd is kept in motion by the hands, by means of a rake, or by machinery until the whole mass of curd and whey reaches a temperature of 98°, when the steam is shut off, but the stirring continues for some time. When the curd is firm and the acid begins to develop, as indicated by the hot iron test, or the acid test, the whey is run from the curd, which process is known as "dipping." After dipping, the curd is stirred and then allowed to "mat" or "cheddar." The curd is afterwards cut in strips about six inches wide and three to six inches thick and placed on racks covered with a cloth for the whey to drain. When the curd becomes "meaty" it is put through a knife mill and cut in strips about the size of a finger. These strips of curd are stirred often enough to keep them from matting together, and also to improve flavor and texture of the cheese.

VII. Salting the Curd.

The ripening process goes on until the curd feels mellow, and when a handful is squeezed it shows a mixture of butter and white whey. The curd is then ready to salt. Salt is applied at the rate of one and one-half to two pounds per 1000 pounds of milk for rapid curing cheese, and two and one-half pounds to three and one-half pounds for slow curing cheese. After the salt has been thoroughly stirred through the curd and the harsh feeling leaves, the curd is then placed in hoops which have



SHORT-HORN HEIFER, CONSTANCE XV., OF MAPLE LODGE.

Bred by A. W. Smith, Maple Lodge, Ontario, and the property of the Ontario Agricultural College, Guelph, Ontario.

a cotton bandage placed inside by means of a bandager. The curd is then firmly packed into the hoops and pressure is applied by means of a screw. The gang press in which the cheese lie horizontally is now used in preference to the upright press. After the cheese have been under pressure for about three-quarters of an hour they are removed from the press and the bandage is neatly pulled up on the cheese and cap cloths are placed on the ends. This is known as "dressing" the cheese. The cheese is now returned to the press and allowed to remain under

pressure for about twenty hours, when they are removed to the curing room. Cheese should always be neat and stylish before placing in the curing room.

VIII. Curing the Cheese.

Cheese are about half made when leaving the press. The green cheeses are indigestible, and the process of curing is the gradual change of insoluble, indigestible curd to a soluble, digestible cheese. Temperature is the chief factor in controlling the rate at which the change takes place, though rennet, salt, moisture and the character of the green cheese are also important factors. Cheese cure best at a temperature between 60° and 65°. During hot weather most curing rooms get too warm. To control temperature in hot weather the room should be well insulated by means of building paper and matched lumber. Double doors and double windows are also necessary. To cool the room use a sub-earth duct, ice, cold water in pipes, or compressed air. A sub-earth duct may be built at a cost of about \$75 by placing two rows of ten-inch tile in a trench about 150 feet long and ten feet deep, and connecting these with the curing room and an in-take pipe with a hood or cowl on it to face the wind at all times. This in-take pipe should be about fourteen to sixteen inches in diameter, and may be made of galvanized iron, and should be thirty to fifty feet high. As the air passes through the tile from the pipe it is cooled to about 60° and enters the curing room at this temperature. The amount of air entering the room is regulated by means of a slide door or a register placed in the floor or wall.

For heating a curing room in spring or fall use a coal furnace or steam from the boiler.

Cheese should remain in the curing room from two to four weeks, if the temperature does not go above 65° to 70° at any time. If the temperature cannot be maintained below 70°, they are best placed in cold storage at the end of one to two weeks. Cheddar cheese are not fit for consumption until they are one to two months old. A well-made cheddar is at its best when six to ten months old or even older than this, if it does not cure too rapidly.

IX. Farm Cheese.

Cheese for home use or for local trade may be made by putting one hundred to three hundred pounds of milk in a can, clean tub or other vessel, adding rennet, cutting with a long knife, heating to 94° to 96°, by taking out some of the whey and heating it on the stove, then pouring it back on the curd. In about two hours take off the whey and allow the curd to mat slightly. Then break or cut it, and when it is mellow apply the salt and put in a small hoop. A hoop to hold the curd

from one hundred pounds of milk should be eight inches in diameter and about the same height. The cheese may be pressed by placing a lever on the cheese and hanging a weight on the farther end. Nice cheese are made in this way at small expense.

X. Dairy Buildings.

Buildings for all kinds of dairy work should be built substantially, with good walls to control temperature, high ceiling (ten to fourteen feet), cement floors, and have a good drainage. Wood, brick, stone or cement may be used. All buildings should have good foundations. The cost of a cheese factory to handle the milk from five hundred cows will be from \$1,000 to \$1,500, and the utensils will cost \$500 to \$800. A separator creamery for five hundred cows will cost about \$2,000 for building, and \$1,000 to \$1,500 for machinery. A cream-gathering creamery complete will cost \$1,500 to \$2,000. A combined factory with skimming stations will cost \$5,000 to \$10,000.

A first-class curing room is a very important part of a cheese factory, and a good refrigerator is very essential in a creamery. Mechanical refrigeration is now common in large creameries, though the smaller ones continue to use ice; sometimes the ice is mixed with about five per cent. salt, and placed in galvanized iron tubes in the refrigerator to secure a greater degree of gold. Butter should be maintained at about 32° while at the creamery.

All dairy buildings should be painted a light color outside with suitable trimmings. The surroundings should be neat and tidy.

XI. Town and City Milk and Cream Trade.

There is an increasing demand for dairy products in towns and cities. This is the most remunerative branch of the dairy, but entails a great deal of labor where the dairyman delivers the milk or cream. It is now customary to ship to large concerns who handle the business in the cities. Some cities are equipped with very excellent facilities for handling and delivering milk and cream to customers. "Clarified," "certified" and "modified" milks are now obtainable in many large cities. The interests of city consumers are considered as never before.

A pure and wholesome milk supply is as important to any town or city as a pure and wholesome water supply. Company or municipal control appears to be the best means of securing this, though there is danger of it becoming a monopoly when controlled by a company, and danger of mismanagement and corruption if controlled by the municipality.

Milk for town trade should be strained at once after coming from the cows, and then be cooled to below 50° by stirring the milk placed in ice-water, or by running it over suitable coolers. Milk should be delivered



SENSATION OF DENTONIA—No. 134368.
Sweepstakes Jersey Cow, Toronto Industrial Exhibition.



DENTONIA'S ISLAND QUEEN—No. 134366.
A noted prize-winner.

in the city at night or early in the morning. No preservatives or coloring of any kind should be added to the milk for town trade. Commercial cream should test about twenty per cent. fat. Where dealers require richer cream, they should pay accordingly. With a separator it is possible to obtain cream of any desired richness by adjusting the machine. When setting the milk for cream to rise, this is not easily done. Time is the factor deciding richness, where the skimming is properly done. To get richer cream allow it to stand for a longer time. Cream for whipping purposes should contain at least twenty per cent. fat, should be partially



A GALLOWAY PRIZE WINNER AT SMITHFIELD, ENGLAND,

ripe, and be as cold as possible. There is more difficulty in whipping separator cream compared with cream raised by gravity, because the albuminous matter is largely removed by separating.

XII. Condensed Milk.

A growing branch of dairying is the manufacture of condensed milk. This milk is ordinary milk from which a large portion of the water has been evaporated, and to which is usually added about fifteen per cent. of cane-sugar. Milk intended for condensing purposes requires to be

especially well cared for, and dairymen patronizing condensing factories are usually paid an extra price for their milk as compared with milk sent to cheese factories and creameries. Factories for condensed milk are likely to become more numerous as the market for this class of dairy goods becomes extended.

XIII. Imitation Butter.

Goods made from animal and vegetable fats and sold for pure butter, are a great menace to the legitimate dairy trade. Dairymen have no particular objection to the manufacture and sale of these articles so long as they are sold on their merits. The majority of customers who buy oleomargarine and the various other imitations of butter, do not know that they are paying for spurious goods, as these are usually sold as butter. In Canada, the manufacture and sale of "oleo" in any form is strictly prohibited by law. The dairymen of the United States are making a gallant fight against butter made from lard, tallow, and oil.

XIV. The Testing of Milk.

A very important part of the duty of a dairyman is to know how to test the percentage of fat in cream, skim-milk, buttermilk and whey. The fat of milk and cream is usually taken as a measure of its value for food. At creameries and for butter making on the farm, the value of milk and cream is almost entirely represented by the fat which they contain. It is customary to test the fat with what is known as the Babcock test, which was discovered by Dr. S. M. Babcock, of Wisconsin, U. S. A., in 1890. The principle of the test is that commercial sulphuric acid (oil of vitriol) is used to dissolve the curdy matters and set the fat free. Centrifugal force is applied, and a further separation of the fat takes place. Hot water is then added and more centrifugal force is brought to bear on the fat, when the percentage is read on the necks of the bottles. If the solids other than fat are calculated, a lactometer is used for the purpose, in connection with the Babcock test and a formula.

For cheese making, the casein of milk should also be considered. This is conveniently estimated by adding the factor 2 to the percentage of the fat.

The testing of the by-products of the dairy show the cheese and butter maker wherein losses occur in manufacture. No up-to-date maker of dairy goods neglects to test the raw material (milk), or the by-products (skim-milk, buttermilk and whey), in order that he may know exactly what he is doing. For testing cows on the farm, the Babcock test is invaluable. The tester and scales should be applied to each individual cow in the herd, in order to know whether cows are profitable



LORD OF DENTONIA—No. 50166.

The imported famous and proud head of the Dentonia Jersey Herd.



BIM OF DENTONIA—No. 52011.

Bred at Dentonia. Sweepstakes Jersey Bull, Toronto Industrial Exhibition.

or unprofitable. There is no other way of securing a money-making dairy herd.

XV. Marketing Dairy Produce.

There is room for business ability and skill in the marketing of butter and cheese. The private dairyman secures private customers who will take a stated quantity weekly, or he may consign to a reliable commission house. The practice of trading butter for dry goods and groceries is to be condemned, as such a market is not discriminating; it pays the same price for all kinds of butter. Butter should be put up in a neat, attractive form for market; and where butter is delivered directly to customers, the person who does the delivering should be neat and clean in appearance, in order to create a favorable impression.

Creamery butter is usually sold to dealers, consigned to commission men, or exported to Great Britain. Butter for export should be lighter in color, salted less, and be milder in flavor than that made for the home trade. Pasteurized butter is favorably received on the British market. Cold storage at the creamery, on the railway and steamer, and at the ports, make it possible to ship butter long distances without deteriorating in quality.

Cheese is sold on boards of trade to dealers, consigned to commission men, or exported direct by factorymen. Some English firms now control the output from certain Canadian factories, and have the goods forwarded as soon as they are ready. This plan saves the dealer's commission on this side of the Atlantic, and appears to be growing in favor.

The shrewdest men should be appointed as salesmen for factories, because they have to deal with shrewd men, and patrons' interests will not be properly looked after unless the very best men are appointed to sell the cheese.

Number of Cheese Factories and Creameries in Canada.

Cheese factories, - - - - -	2575
Creameries, - - - - -	725
Combined cheese factories and creameries, - -	317
Total, - - -	3617

TEXAS CATTLE FEVER.

THE TEXAS-FEVER TICK AND METHODS OF EXTERMINATING IT.

- I. LIFE HISTORY OF THE TICK.—II. DEVELOPMENT ON THE GROUND.—
III. HOW TO FREE CATTLE OF TICKS.—IV. PICKING OR BRUSHING
TICKS OFF CATTLE.—V. SMEARING OR SPRAYING CATTLE WITH A
DISINFECTING SOLUTION.

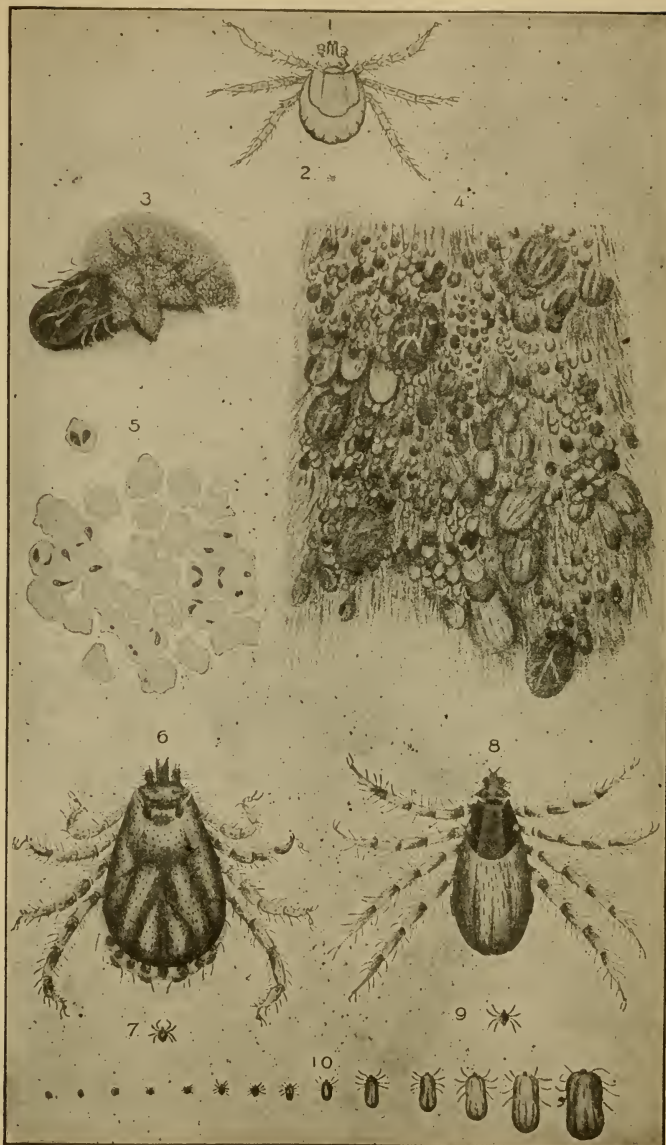
The more important losses for which the tick is responsible are as follows:

1. Deaths from tick fever among native cattle and purebred cattle imported from the North for breeding purposes.
 2. Deaths of cattle north of the quarantine line from fever following the occasional accidental introduction of the tick.
 3. The temporary and permanent arrest of growth and development resulting from attacks of the fever.
 4. The decrease in weight and the lessened rate in putting on flesh in the case of beef cattle, and the decrease in the amount of milk produced by dairy cattle, as the result of the irritation and loss of blood occasioned by great numbers of ticks.
 5. The prevention of southern breeders from exhibiting their stock in the North.
 6. The decreased price that southern cattle bring on the market on account of the restrictions placed upon them.
 7. The considerable expense incurred each year by the Federal Government and the infested States in establishing quarantine lines and in enforcing regulations to prevent the spread of Texas fever.
- Various writers have estimated the annual loss due to the tick at from \$40,000,000 to \$100,000,000. These figures should be ample argument, even to the most conservative, for the eradication of the tick.

I. Life History of the Tick.

Before methods of eradication can be carried out intelligently and successfully, it is necessary to know the life history of the tick, and the influence of temperature, moisture, and other climatic conditions on the various stages of its existence.

The usual host for this tick is the cow or ox. Frequently, however, horses, mules, deer, and sometimes even sheep serve as hosts. But none of these latter animals, with the possible exception of deer, are susceptible to tick fever, consequently they suffer from the tick as a simple parasite and not as a transmitter of disease, although they must be considered in plans for eradication.



TEXAS-FEVER PROTOZOA AND THE TICKS WHICH TRANSMIT THEM.

Only a part of the development of the tick takes place on the host; the rest of the development occurs on the pasture occupied by the host.

II. Development on the Ground.

In tracing the life history of the cattle tick it will be convenient to begin with the large, plump, olive-green female tick (fig. 1), somewhat more than half an inch in length, attached to the skin of the host. During the few preceding days she has increased enormously in size as a consequence of drawing a large supply of blood.

When fully engorged she drops to the ground, and at once, especially if the weather is warm, begins to search for a hiding place on moist earth beneath leaves or any other litter which may serve as a protection from the sun and numerous enemies. The female tick may be devoured by birds or destroyed by ants, or may perish as the result of unfavorable conditions, such as low temperature, absence or excess of moisture, and many other conditions; so that many which fall to the ground are destroyed before they lay eggs.

Egg laying (see fig. 2) begins during the spring, summer, and fall months in from two to twenty days, and during the winter months in thirteen to ninety-eight days. The eggs are small, elliptical-shaped bodies, at first of a light amber color, later changing to a dark brown, and are about one-fiftieth of an inch in length. As the eggs are laid they are coated with a sticky secretion which causes them to adhere in clusters and no doubt serves the purpose of keeping them from drying out. During egg laying the mother tick gradually shrinks in size and finally is reduced to about one-third or one-fourth her original size. Egg laying is greatly influenced by temperature, being retarded or even arrested by low temperatures. It is completed in from four days in the summer to one hundred and fifty-one days beginning in the fall. During this time the tick may deposit from a few hundred to more than 5,000 eggs. After egg laying is completed the mother tick has fulfilled her purpose and dies in the course of a few days.

After a time, ranging from nineteen days in the summer to one hundred and eighty-eight days during the fall and winter, the eggs begin to hatch. From each egg issues a small, oval, six-legged larva or seed tick (fig. 3), at first amber colored, later changing to a rich brown. The seed tick, after crawling slowly over and about the shell from which it has emerged, usually remains more or less quiescent for several days, after which it shows great activity, especially if the weather is warm, and ascends the nearest vegetation, such as grass, or other herbs, and even shrubs.

Since each female lays an enormous mass of eggs at one spot, thousands of larvæ will appear in the course of time at the same place and will ascend the nearby vegetation and collect on the leaves. This instinct of the seed

ticks to climb upward is a very important adaptation to increase their chances of reaching a host. If the vegetation upon which they rest is disturbed, they become very active and extend their long front legs upward in a divergent position, waving them violently in an attempt to seize hold of a host.

The seed tick during its life on the pasture takes no food and consequently does not increase in size, and unless it reaches a host to take up the parasitic portion of its development, it dies of starvation. The endurance of seed ticks is very great, however, as they have been found to live nearly eight months during the colder part of the year.

III. How to Free Cattle of Ticks.

Among the most important measures to be adopted in eradicating these parasites from cattle in the infested districts may be mentioned: (1) Picking or brushing them off; (2) smearing or spraying the animals with a disinfecting solution, and (3) dipping the "ticky" animals in a vat containing a solution capable of killing the ticks without injury to the cattle.

The systematic application of one or more of these methods, together with appropriate measures for eradicating or destroying the cattle ticks upon pastures, has been successfully adopted in certain sections, and has thus diminished the area of the infested district.

IV. Picking or Brushing Ticks off Cattle.

Where the herd is small a very effective but laborious method is to pick off these parasites by hand or to scrape them off with a dull knife or a currycomb. This should be done at least three times a week in order to find all the adults before they mature and fall off, as by this system the smaller ticks which at first escaped detection will be found before they are fully developed. After removing the ticks they should be destroyed, preferably by burning. Care should be taken to go over all parts of the animal frequently by the ticks, especially under the belly, around the tail and udder, and inside the legs. After the ticks are picked or brushed off, the cattle should not be neglected, but should be carefully examined later for the presence of ticks which have been picked up in the meantime. If this work is thoroughly performed and no ticks are allowed to fall off and lay eggs from June 1 to the end of November, the cattle will be free of ticks, and the pastures will have had an opportunity of becoming cleaned.

V. Smearing or Spraying Cattle with a Disinfecting Solution.

Greasing the legs and sides of cattle with cotton-seed oil, fish oil, or Beaumont crude petroleum will assist in preventing the ticks from crawling up on the body. In small herds, smearing the cattle with a mixture of 1 gallon of kerosene, 1 gallon of cotton-seed oil, and 1 pound of sulphur, or with a mixture composed of equal parts of cotton-seed oil and crude petroleum, or with Beaumont crude oil alone, has proved efficacious when

applied to the skin two or three times weekly during the tick season. For this purpose sponges, syringes, brushes, mops, or brooms may be used. This method not only kills the older ticks on the cattle by mechanically plugging up their breathing pores, but also makes the legs so slippery that the seed ticks are unable to get a foothold in order to crawl up on the cattle. Where a large number of animals are to be treated, but not sufficient to make it advisable to construct a dipping vat, spraying the infested animals has given very favorable results. The animals should be placed in a chute or a stall, or tied to a tree, and then sprayed with Beaumont oil or a 5 per cent solution of any of the standard coal-tar dips. The solution may be applied by means of a force pump, such as is used by orchardists to spray fruit trees, or by placing the solution in a barrel upon a wagon or on a platform above the animals and allowing the fluid to gravitate through a hose, to the end of which is attached an ordinary sprinkling nozzle. The solution is then allowed to flow over the skin of the animal, especially upon the legs and under portions of the body. If the cattle are on tick-infested pastures, this treatment—either smearing or spraying—must be continued through the whole season, and if thoroughly done it will leave the fields free from ticks the following year.

SORGHUM POISONING.

This disease has been found to be due to the elaboration, within the tissues, of stunted or second-growth sorghum, a glucoside, which later develops into prussic, or hydrocyanic acid, and causes death very rapidly. This was satisfactorily determined at the Nebraska Government Station while Dr. Peters was the veterinarian there.

Virtually, it is a case of prussic-acid poisoning, and death being so sudden (this being one of the most active poisons known), there is not very much to be seen by way of symptoms previous to death. Being aware of the fact that sorghum, in this condition, is the cause, stockowners usually either do not allow their animals to use the sorghum, or turn them on to it for only a short time at first, or allow them to have something else in their stomachs before turning them on to the sorghum. The remedy is, therefore, a question of *prevention* rather than cure, as there is little that can be done to counteract the effect of the poison after it has been absorbed into the system. So that, in a general way, the cause may be said to be this poison in the stunted, or second-growth sorghum.

Symptoms: Sudden death.

Treatment: Prevention, along the lines here suggested.

There is a similar poison in other forage plants, and on certain characters of soils, than sorghum.

THE DEHORNING OF CATTLE.

- I. DEHORNING BY SNUBBING HEAD TO STANCHION RAIL.—II. TREATMENT AFTER DEHORNING.—III. TO PREVENT HORNS GROWING ON YOUNG CALVES.—IV. APPLYING THE CAUSTIC.—V. AGE WHEN CAUSTICS ARE NOT EFFECTIVE.

I. Dehorning by Snubbing Head to Stanchion Rail.

The dehorning of partly developed and adult cattle could be very satisfactorily performed without other apparatus or instrument than a good strong clothes line and a clean, sharp, meat saw or a miter saw with

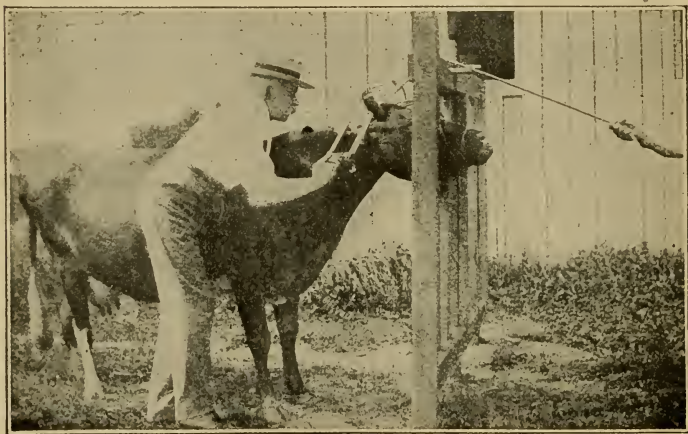


FIG. 47.—DEHORNING WITH SAW, COW'S HEAD SNUBBED TO STANCHION RAIL.

out a rigid back — in the hands of a fairly good mechanic. The same simple means for controlling the animal is just as applicable when the dehorning knife is to be used as when the horns are to be removed with the saw. This consists in securing the head of the animal to the horizontal rail or stringpiece which holds the upper ends of the stanchion boards. The animal is put in the stanchion in the usual manner; then one end of a heavy clothes line is passed around the upper part of the neck and tied in a knot that will not slip, otherwise it will choke the animal. The free end of the rope is now carried between the horns, through the stanchion to

the front, up and over the horizontal stanchion rail, then down underneath the neck and up and through the top of the stanchion rail to an assistant, who should hold it firmly. Now, release the stanchion, allowing the animal to withdraw its head, so that the horns are just inside of the stanchion rail or stringpiece; then, keeping the head tight, pass it once around the muzzle, up and over the stanchion rail, and through to the front again to the hands of the assistant, who should stand 3 or 4 feet in front of the animal and hold the rope firmly, but prepared to release it when told to do so by the operator. The animal is now ready for the dehorning operation.

It is necessary that the rope be held by an assistant, as in the event of the animal struggling during the operation so as to throw itself off its feet,

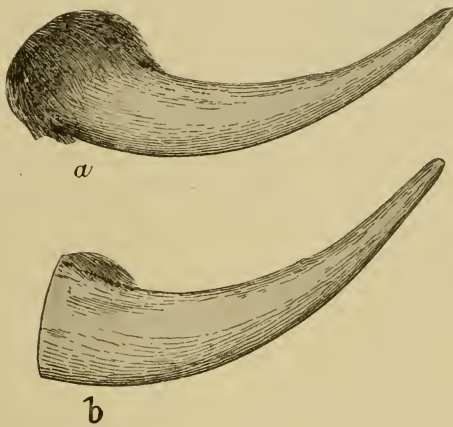


FIG. 50.—HORNS SHOWING (a, PROPER AND b, IMPROPER) CUTTING.

or if there appears to be danger of its choking, the rope may be slackened promptly at the word of the operator and the animal partly released. This, however, is rarely necessary, for as soon as the head is secured the operator should be ready, standing at the right shoulder of the animal with his saw, and proceed to saw off first the right and then the left horn. The horns should be severed at a point from a quarter to a half inch below where the skin joins the base of the horn, cutting from the back toward the front. Figure 47 shows the animal and the operator in position for the dehorning operation by this method. It is a good plan before commencing the real work to experiment upon an animal in the matter of control by snubbing the head to the stanchion rail as described.

If the stanchion rail is too wide to permit of properly securing the lower part as well as the upper part of the animal's head, the turn of the rope

around the muzzle may be omitted and the last lap of the rope carried around the stanchion rail to the front and to the hands of the assistant. The rope should pass each time over the neck of the animal to the stan-

chion rail so that the laps are between the horns, in order that the rope may not interfere with the work of the saw.



FIG. 51.—HEAD OF STEER SHOWING RESULT OF PROPER DEHORNING.

II. Treatment After Dehorning.

It is not usual to apply any preparation after the operation of dehorning to prevent bleeding, as the loss of blood is not sufficient, as a rule, to be of consequence. Care should be taken, however, to prevent substances from getting into the openings left after the horns are removed. The horn cores are elongations of the frontal bones of the skull, and are hollow. They communicate with the frontal sinuses, or air spaces,

of the head; therefore foreign substances which would act as an irritant in these cavities are apt to set up an inflammation, resulting in the formation of pus or an abscess, which may prove quite serious. Fragments of horn detached in the process of dehorning would serve as such irritant and by their presence in these cavities cause inflammation. This trouble, though, is of infrequent occurrence, but would appear more liable to happen when the dehorning instruments are used, on account of their tendency to crush, especially in the case of old animals, whereas the saw cuts clean. If proper care is taken, however, such an occurrence following dehorning may in almost every instance be avoided.

Occasionally animals after being dehorned and turned out of the stable will rub their heads against a dirt or gravel bank or the rough bark of a tree, and foreign material may thus get into the cavities, though usually the soreness of the parts is sufficient to prevent this.



FIG. 52.—HEAD OF STEER SHOWING BAD APPEARANCE CAUSED BY IMPROPER DEHORNING.

If the animals are dehorned when flies are about, it is well to apply some pine tar with a view to keeping flies from the wounds. Some operators do this in nearly all cases, thinking that it facilitates healing. The dehorning operation should always, when possible, be performed in cool weather, and upon animals which have at least attained the age of two years.

Another method of restraint is to throw the animal and hold it stretched flat on the ground by means of a rope around its neck, held by a man on horseback with a turn around the saddle pommel, a second rope around the hind feet, similarly held by another man on horseback.

In the absence of horses these ropes can be secured by taking a turn around a post. After the animal is thus secured an assistant grasps the nose and upper horn, turning the head so that the lower horn can be removed first. This obviates the danger of fracturing the lower horn, and allows the blood to flow directly on the ground and the head to be held flat for the removal of the upper horn. Whether a saw or the shears be used, the cut must be made uniformly at a line sufficiently below where the skin joins the horn, in order to get satisfactory results from the operation. If the cut is made too high an irregular, gnarly growth of horn is very apt to follow. It will be seen that the point of union of the skin and horn varies in different cattle; hence there can be no rule of measurement, except as the eye becomes trained to see the point or line at which the cut should be made, which can soon be easily and accurately approximated by carefully noticing the variation referred to in different animals, which variation is largely influenced by breed, together with the texture, quality, and setting of the horns. In the beef breeds fully one-half inch of skin, all around, is usually taken off with the horn.

Figure 50 illustrates the difference between a proper and an improper cutting, and figures 51 and 52 show the appearance of animals' heads after proper and improper dehorning.

III. To Prevent Horns Growing on Young Calves.

When circumstances are favorable, as in the case of farmers who build up their herds by raising the progeny, the horns may be prevented from growing by a simple and practically painless method, and the custom of preventing the growth of the horns rather than deferring the matter with the necessity of removing them from the grown animal is becoming more popular and more generally practiced under all conditions except in the case of calves dropped on the open range. To do this successfully it is necessary that the calf should be treated not later than one week after its birth, preferably when it is from three to five days old. The agent to be used may be either caustic soda or caustic potash, both of which may be procured in the drug stores in the form of sticks about the thick-

ness of an ordinary lead pencil and 5 inches long. These caustics must be handled with care, as they dissolve the cuticle and may make the hands or fingers sore. The preparation of the calf consists in first clipping the hair from the parts, washing clean with soap and warm water, and thoroughly drying with a cloth or towel. The stick of caustic should be wrapped in a piece of paper to protect the hands and fingers, leaving one end of the stick uncovered.

IV. Applying the Caustics.

Moisten the uncovered end slightly and rub it on the horn buttons or little points which may be felt on the calf's head, first on one and then the other, alternately, two or three times on each, allowing the caustic to dry after each application. Be very careful to apply the caustic to the horn button only. If it is brought in contact with the surrounding skin it will cause pain. Be very careful also not to have too much moisture on the stick of caustic, as it will excoriate the skin and make the parts sore if allowed to run down over the face. After treatment keep the animal protected from rain, as water on the head after the application of caustic will cause it to run down over the face. This must be carefully avoided.

V. Age When Caustics are Not Effective.

When a calf is three or four weeks old the caustics or caustic preparations are of little or no use. The horns on animals of this age can be removed by one cut of a good sharp pocket knife, but when the treatment is delayed to this age there is considerable hemorrhage as the result of cutting the starting horns, which would be entirely avoided if the animals are treated with one of the caustics at the earlier age above indicated.

SAND IN HORSES.

This disease pertains to a sandy country and is caused by the horse pulling up by the roots grass and other plants in grazing, and thus swallowing a small amount of sand. The sand is indigestible and, being heavy, settles in the lower portion of the stomach and becomes impacted. It is also aggravated by drinking in shallow water. When the water is muddy it includes sand, which is precipitated while in the stomach.

Prevention: Do not allow stock to drink in very shallow places or water that has been disturbed to the extent of becoming muddy. Use troughs in the absence of clear water of proper depth. Harden down the pasture by using special grasses to bind the sand, and pack it by rolling.

What to do: Pollard (shorts) gruel used as feed is beneficial in helping to remove sand, but not reliably effective because of the weight of the sand and its compactness in the stomach. In its early stages turn the animal on his back and massage the belly. Another treatment consists of giving frequent doses of very strong coffee.

POISONS AND THEIR ANTIDOTES.

I. THE PURPLE LOCO WEED.—II. THE WHITE LOCO WEED.—III. POISONING BY LOCO PLANTS.—IV. SYMPTOMS OF LOCO POISONING IN HORSES.—V. SYMPTOMS OF LOCO POISONING IN CATTLE.—VI. SYMPTOMS OF LOCO POISONING IN SHEEP.—VII. TREATMENT OF LOCOED ANIMALS.—VIII. SUMMARY.

I. The Purple Loco Weed.

Astragalus mollissimus, popularly known as the "purple loco" or the "woolly loco," sometimes as the "Texas loco," or the "true loco," is the plant that in the past has been considered as the more probable cause of loco poisoning. This is sometimes known as the "stemmed loco plant,"



A PLANT OF THE PURPLE LOCO WEED.

because it has true stems, while the white loco weed is stemless. The former is a perennial plant growing in patches on adobe soil, in depressions rather than in elevated situations. It rarely grows in the abundance which is characteristic of some of the other so-called "loco plants," but it may cover several acres. Under favorable circumstances where a plant grows for several years it may become, perhaps, a foot in height and possibly 2 feet in diameter. The flowers are a very deep purple and the pods short, black, and thick. The leaflets are ovate or elliptical and very densely covered with hairs, from which the plant gets its common name of "woolly

loco." The plant has a decumbent habit; that is, the long branches are inclined to lie rather close to the ground.

The purple loco plant is found as far north as South Dakota, as far south as Mexico, and as far west as parts of Arizona. Its eastern limit may be stated as central Kansas and Nebraska.

Treatment: — Keep animals away from it and feed nutritious food. Cattle or sheep may be disposed of by fattening.

II. The White Loco Weed.

The white loco plant (*Aragallus Lamberti*) is distinguished from the purple loco by its long, lanceolate leaves and by the general habit of the plant, which is erect rather than decumbent. It has no true stem, and on this account is sometimes called the "stemless loco." The flowers are ordinarily on long flower stems and commonly are white in the Plains regions, although there is considerable variation in their color. Purple flowers are not uncommon. In the mountain regions the white loco ordinarily has very deeply colored flowers—deep shades of violet and purple. It blossoms earlier than the purple loco. Plants blossom in Colorado in the latter part of April, and early in the summer the flowers disappear and the pods are found upon the still erect flower stems. The pods of *Aragallus Lamberti* are slender and filled with seeds, which, when the pods dry, rattle as a person passes through a patch of the plants, making a sound which closely resembles the warning of a rattlesnake. In this plant, as in the purple loco, there is an extremely long root, growing down from three to six feet.



A PLANT OF THE WHITE LOCO WEED IN FLOWER

The white loco is found much more widely distributed than the purple loco, extending from the northern to the southern border of the United States, as far east as central Minnesota, and as far west as western Utah and Arizona.

III. Poisoning by Loco Plants.

It was found when the loco investigation was undertaken by the Bureau of Plant Industry that there was a very general belief among stockmen that the purple loco weed was a poisonous plant and a less general belief that the white loco weed was injurious.

The field work which has been carried on during the past three years has demonstrated that horses, cattle, and sheep in the field can be poisoned by feeding upon these two plants. It has also been shown very clearly that the purple loco weed is very rarely injurious to cattle. In those sections where the purple plant is the only loco weed known, the losses from poisoned stock are found to consist almost exclusively of horses. This seems to be because cattle will not readily eat this plant. The experiments show that under ordinary circumstances most cattle would prefer to starve rather than to eat any of the purple loco weed. The majority of horses do not take readily to this plant except as they are induced in the first place to eat some of it because of short feed. It has been demonstrated that the so-called loco disease of the Plains is not simply a matter of starvation, as has been supposed by many, and it is also clear that when other food is abundant very few horses will eat loco. When, however, because of shortness of grass a horse is induced to begin the eating of loco, it is very likely to contract a habit which leads to continual feeding upon the weed, with eventually fatal results.

In regard to the white loco weed the experiments showed very clearly that horses, cattle, and sheep will eat this plant with great readiness, particularly if they come across it at a time when grass is somewhat scarce. Both the white and the purple loco weeds are green during the winter, when all grass on the plains is dry and brown. They are prominent plants, too, which induces an animal to try them, and because of their succulent character and somewhat pleasant taste, it may continue to eat them. Not only horses but cattle and sheep will eat the white loco weed, and sometimes even with great avidity. Many animals will eat this weed even when grass is abundant, but it is more common for the habit to be contracted during the autumn, winter, and spring, when there is a scarcity of green grass. Both horses and cattle will eat the white loco weed readily, but perhaps cattle take to it more readily than horses. During the spring months, before the grass starts, where the white loco weed is abundant, practically all animals eat more or less of it. As the grass becomes more abundant many of these leave the loco weeds and devote themselves

entirely to grass. These animals as a rule do not seem to be injured by the habit. Others, however, acquire a taste for the plant and an appetite which is not easily overcome, and will continue to eat the loco weed even where there is an abundance of other feed. Whether an animal will become locoed or not is then simply a matter dependent upon the individual. Some cattle and horses will eat loco weeds during a part of the year for a period of years and suffer no harm. Others acquire a habit which leads them to eat this plant almost exclusively, and these will die within a few months or, in some cases, even within a few weeks.

Sheep, also, are poisoned in much the same way as horses and cattle. The effect of the poisoning seems to be peculiarly noticeable on lambs. Frequently lambs will die within two weeks of the time when they commence to eat this weed, and without any marked loss of flesh.

IV. Symptoms of Loco Poisoning in Horses.

The first symptom of loco poisoning in horses is often a change in the general condition of the animal. If high-lived the animal becomes somewhat dull. Following this, irregularities in its gait and in its mode of eating appear. The irregularities in the gait may be due partly to weakness and simulate a paralytic affection. The horse drags its feet more or less, this being particularly noticeable in the hind legs. Associated with this paralytic condition is an apparent loss of muscular coordination. In stepping over a slight obstruction the horse lifts its feet unnecessarily high, or in going over a rut in a road it may leap as if jumping over a ditch. As the disease progresses the animal becomes solitary in its habit and seems to lose very largely its nervous sensibility. If one approaches a badly locoed horse the horse does not notice the person until he is within a few feet, when it may suddenly rear and perhaps fall over backward. When it drinks or when it eats there is a peculiar stiff motion of the jaws, showing a lack of control of the muscles. If a locoed horse is used either in riding or driving, this lack of muscular coordination may make it extremely dangerous, as such a horse shies violently at imaginary objects, can not readily be led or backed, and if started in motion is inclined to go in an automatic fashion at the same gate until stopped by some obstruction. In the later stages of the disease the animal loses flesh, its coat becomes rough, and eventually it ceases to eat and dies.

V. Symptoms of Loco Poisoning in Cattle.

The symptoms of locoed cattle are very similar to those of locoed horses, the differences being only such as would be expected from the different character of the nervous organization of the animals. There is the same lack of muscular coordination, and while a steer is not apt to fall over

backward, it will start and tremble and perhaps rear and jump backward when suddenly alarmed. A badly locoed steer shows a violently shaking head, particularly after it has become heated. Ordinarily a locoed steer is dull, but under some conditions it may become frantic and will run into obstructions in an utterly unreasonable way. It is commonly said by stockmen that it is impossible to drive a locoed steer, because it is just as likely to run into the driver as in the opposite direction.

Locoed cattle gradually lose flesh, have staring eyes and rough coats, go to water less and less frequently, and eventually die of starvation.

VI. Symptoms of Loco Poisoning in Sheep.

The symptoms of poisoning in sheep are not so marked as those in horses and cattle. The lack of muscular coordination is not so noticeable, but still exists. Locoed sheep show, perhaps, more clearly the weakness which goes with the disease, as they stumble and fall, and rise again only with great difficulty. The symptoms of loco poisoning in sheep resemble the symptoms caused by "grub in the head," or *Oestrus ovis*, and it is at times difficult to distinguish between sheep affected by this grub and those that are poisoned by loco weeds.

VII. Treatment of Locoed Animals.

The first, and without any doubt the most important, part of the treatment is the food. As a matter of fact many locoed animals, especially in the earlier stages of the disease, can be cured by simply taking them away from the loco weeds and feeding them upon nutritious food like alfalfa and grain. All chronically locoed animals are constipated, and the food should be of such a character as to remove this condition. For this purpose alfalfa and oil meal have been used, although any other food having laxative properties would be useful. Probably nothing is better for locoed horses and cattle than to turn them, under proper precautions, into a field of alfalfa.

Where the constipation is of an obstinate character it has been found desirable to give doses of Epsom salts. The dose used in experiments with mature cattle was about one pound, given in the form of a drench. For younger animals the dose was smaller, calves receiving not more than two ounces. For horses the dose should be about eight ounces, and for full-grown sheep four ounces. These doses varied with the size and condition of the animal, but commonly rather small doses were found sufficiently effective. It was not necessary to repeat the treatment many times, provided care was taken to give food of a laxative character.

Very much can be accomplished in the way of preventing loco poisoning by the proper handling of stock. It has already been stated that it is

in times of short feed that the stock commonly contract the habit of loco feeding. Feeding hay during this period will prevent many animals from acquiring the habit. On some ranges the loco weeds have a rather definitely limited distribution; in such cases, if kept away from the infested areas until the grass is started, few of the stock become locoed.

VIII. Summary.

(1) The purple loco and the white loco weeds produce the loco disease. The former is the most poisonous, but it affects horses almost exclusively, because other animals do not eat it. The latter is eaten by cattle and sheep, as well as by horses, and produces the disease in all of these animals.

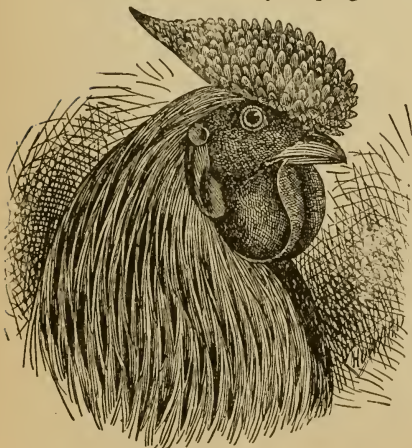
(2) Barium is found in many loco plants, and its connection with the poisonous effects is still under investigation.

(3) Other leguminous plants in Arizona, New Mexico, and California, locally known as "rattleweeds," produce the same symptoms as the purple and the white loco weeds and are supposed to contain the same poisonous substance.

(4) Locoed animals may recover under careful feeding, but the cure is hastened by the use of Fowler's solution for horses and strychnine for cattle.

(5) The purple and the white loco weeds may be eliminated from fenced pastures, and provided the crown of buds is cut off they will not grow from the roots.

(6) In some localities much can be accomplished in the way of preventing loco poisoning by feeding horses, cattle, and sheep during periods of short feed and by keeping the stock away from infested areas.



HEAD OF REDCAP COCK.



HEAD OF AMERICAN DOMINIQUE, MALE.

POULTRY

THE SELECTION OF BREEDING STOCK.

By W. R. Graham, B. S. A., Manager and Lecturer Poultry Department, Ontario Agricultural College, Guelph, Ontario.

Like breeding other kinds of live stock, there are certain conformations that are desirable, and are sought after more or less, and there are other shapes which are not desirable.

It is not the purpose of this article to go into the detail of breeding fowls, but more particularly to try and show that there are vast differences in the shape of different representatives of the same breed; some of which we consider desirable, while others are not what one would wish to use in a breeding pen.

From observation and study we have learned that birds of a certain type or shape have usually a good constitution, and have the ability to make good use of the food, while other birds representing other types are more or less lacking in vigor and in feeding qualifications.

Take, for example, cut No. 1. This is the cut of a Barred Rock cockerel, which has a very desirable conformation. You will notice that the beak (bill) is short and stout, being well curved; also that the head is moderate in width and the eye bright. These are all indications of constitution. Now, compare this head with



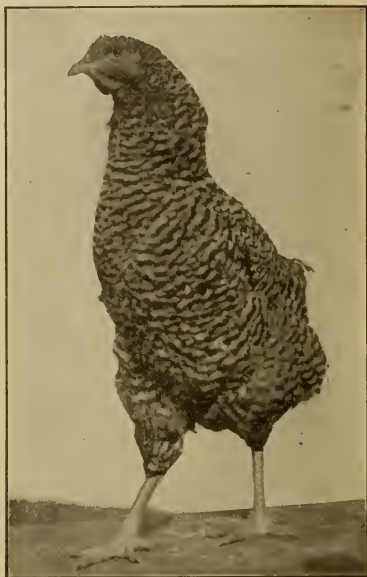
No. 1.

that in cut No. 2. Here you see a long, narrow head, a very long beak, and a sluggish eye. These are not desirable points. We naturally expect this bird to be lacking in vigor, constitution, etc., which is actually the case.

Again, compare the two birds as to width of breast. We like a wide breast, so as to get plenty of meat on each side of the breast-bone; also we must have lung and heart capacity. This, of course, brings a wide back. No. 1 has a fine wide breast, which is also full or prominent. No. 2 is rather narrow in the breast. No. 1 is also deeper. Now, if you were so situated as to be able to examine these birds critically, you would find No. 1 had a very long breast-bone extending well back; also that there was exceptional width between the legs, and, further, that he stood straight upon his legs, the feet being firmly placed upon the



No. 2.



No. 3.

ground. No. 2 is very narrow between the legs; the legs also bow toward each other at the joints, and, further, he does not stand straight upon his legs; or, in other words, he is sickle-hocked. His breast-bone is medium in length. No. 1 has a fair size bone. No. 2 is a little heavier in bone. In width of back No. 1 is far superior to No. 2. In length of back No. 2 has a slight advantage. Here is the weakest point in No. 1, in that he lacks length of back. A very long back is *not all* desirable. A short back is much better, but a medium length of back is what is wanted. This is necessary to get weight. A short bird must

be uncommonly wide to scale equal to a bird with a medium length of back. In size of thigh No. 1 is much larger, and is firmer in the flesh. While the thigh is not the most desirable portion of the bird, yet I like to see a bird with good muscle.

In judging birds from a market or utility standpoint, one must bear in mind that the breast meat is the most valuable. A bird possessing length, width and depth is the one the buyer is looking for. A wide back is pleasing to the eyes, and is also some indication as to the under line, and, further, as to constitution.



No. 4.

I may add that cockerel No. 1 is the best type of a market bird in his class that I have seen for some time, being extra strong in breast points.

Compare the cuts of the hens. No. 3 is a long, narrow hen with legs that bow towards each other. She is an indifferent layer and feeder. She has a long neck, a narrow but a moderate beak and eye. She is not constitutionally strong, and has always been somewhat lacking in vigor.

No. 4 is not represented to advantage. She is a fine type in every respect, having plenty of weight, is active, bright, and is a fairly good

layer. This hen was pronounced by one of the most expert judges in Ontario to be of exceptional fine Rock shape.

In No. 5 we have a rare bird. This hen as a pullet produced one hundred and eighty-three eggs in nine months (no record kept earlier in the season), and is further a fine market bird. Note the stout beak, the active eye, the prominent breast, possessing plenty of width and depth; also the width between the legs. The color of this hen is also very good from a show standpoint. She lacks in bone, also is a little short in the leg for a Plymouth Rock. This is one of the few hens that we can show to advantage to the farmer, the market poultryman, and to the fancier, and have all very well pleased.



No. 5.

Diseases Peculiar to South Africa

South African Horse Sickness

What It Is. Horse sickness is a peculiar epizootic disease of South Africa, affecting horses, asses and mules, but the two latter show a greater resistance to the disease than the horse. It exists in all territories and colonies south of the Equator, and has been known in Cape Colony since 1780. In a report of the late Lieut.-Col. Nunn, D. S. O. A. V. D. of October, 1888, he describes four kinds of Horse Sickness; (1) Acute or Pulmonary, (2) Blue Tongue, (3) Dikkop, and (4) Sub-acute or Bilious form. It affects isolated horses as well as those in troops, and sometimes the old before the young, appearing as often among those in the open air as those kept in sheds.

The first form is rapidly fatal, while the form known as the Dikkop, although fatal, has a slower course. It prevails mostly in low-lying districts, in kloofs several thousand feet above sea level, while districts without kloofs or valleys only a few feet above sea level are free, if they are some distance from the sea, probably owing to there being less moisture in the atmosphere.

The Horse Sickness season begins about November and lasts till about May. If rains come early and the summer season is wet, then this disease is rife, but if it is a dry summer very few cases occur. February, March, and April are generally the worst months for Horse Sickness, and on moist days with the air humid and the temperature high, the disease is most prevalent.

Cause. The cause of Horse Sickness is at present undiscovered. Probably the micro-organism is very minute, for under the highest power of the microscope, it is invisible, and passes through the best made filters. This is proved by the fact that filtered blood when injected into the horse produces the disease. The following are some of the leading theories and ideas, as to the possible *modes of infection*. The organism evidently requires heat and moisture for its propagation and vitality; and it appears to have a miasmatic origin, and to be transmitted by dews, fogs, and winged insects. The writer has known cases to occur in infected districts by the animal eating dew-laden grass before the sun has had time to drive off the dew. Inoculation by mosquitoes, etc., is undoubtedly a very probable mode of infection. Mosquitoes and other winged insects are likely carriers of the disease when one considers the vast numbers in which they are bred in stagnant waters and kloofs saturated with dew.

How To Know It. In the Acute or Pulmonary form the symptoms are comparatively absent until just before death. The animal seems to be in perfect health and, within an hour, characteristic symptoms appear, viz., respiration, animal lies down and gets up immediately, followed by violent heaving of the flanks, staggers about for a few minutes, falls down, ejects a quantity of white froth from the nostrils and mouth, and probably dies within a few minutes. Owing to the absence of symptoms until just before death, it was thought that the disease was of short duration. It is proved, however, that the period of incubation is seven or eight days; and from the period of infection to the symptoms above described, it will be noticed that there has been a gradual rise of temperature, each day higher than the preceeding day, and the evening temperature higher than the morning, till it rises to the final stage, 103 F. or 107 F., when there is a sudden drop to below normal, and then death. During the period of incubation there have been going on other changes not visible to the ordinary eye, viz., a dusky yellow discoloration of the eye, spots are seen on the white parts accompanied, perhaps, by a watery discharge from the eyes. By placing one's ear close to the front part of the neck, a peculiar dry, crackling sound might be heard; and then is seen a swelling of the parts above the eye and eyelids. Inside, the nostrils change color and become congested, with swelling along the line of the jugular vein. The horse becomes easily tired, stands lazily, resting its head upon some support and, finally, the symptoms above described soon put an end to the animal's suffering.

The Dikkop Form. The symptoms in this form usually appear some days before death, gradually becoming well defined towards the end. The head, neck, and lips become swollen, in some cases enormously; the eyes close and lower lip drops, and death soon follows.

Blue Tongue Form (Blaauw Tong). This is a sub-variety, in which the swellings of the head and neck are not so marked, but the tongue becomes very much swollen and of a vivid blue colour, due to intense venous congestion.

The Bilious Form (or Subacute). The symptoms come on gradually, the animal being off its feed. There is constipation, and the faeces are coated with mucous. The urine is of a deep amber color, temperature of the body 106 F. to 108 F. and the pulse is quick and hard. Abdominal pains are frequently noticed, sometimes violent, and often accompanied by a foul smelling diarrhoea. Jaundice sets in. Sometimes brain symptoms appear, in which case it is hopeless; as also when swellings, filled with a quantity of yellow fluid, occur on the limbs and body, the owner may expect a fatal issue. The symptoms just described might equally apply to those of biliary fever, and indeed is many times mis-

taken for that disease; but each disease is distinct from the other, and although Edington claims that horse sickness, gall sickness and veldt sickness are only forms of one disease, the investigations of Kock, Theiler, the late Mr. Hutcheon and others, have proved this to be a fallacy. Space, however, will not permit giving the full result of their investigations.

What To Do. Prevent the disease by careful attention, and by protective inoculation, and by not allowing the horse to eat dew-laden grass until well dried by the sun. If possible, remove horses to higher veldt where frosts prevail. If animals have to remain in districts infected with horse sickness use nose bags (as illustrated on page 394) previously steeped in some good antiseptic fluid. Put on before sun set and take off after sun rise, thus preventing grazing and acting as an antiseptic. *Inoculation* (protective) is by far the best method. Kock, Theiler and others, have succeeded in giving immunity by inoculation, using both virulent blood and antitoxic serum, and although the final stage of their investigations have not yet been reached, they are sufficiently advanced to give immunity for a short period.

Blue Tongue (Blaauw Tong) (Bekziekte)

or Malarial Catarrhal Fever of Sheep

What It Is. Blue Tongue is an inoculable disease of sheep, characterized usually by fever and many definite symptoms, comprising, chiefly, lesions of the mouth and feet. It is common in many parts of the Cape Colony, Bechuanaland, British Protectorate and Transvaal.

Prevalence. The late Director of Agriculture, Cape Colony, long ago pointed out that this disease was met with both on low and high veldt, under conditions which were recognized as being also most favorable for the production of horse sickness, but being much more prevalent and wide spread than the latter, and occurring regularly every day in certain localities. Less frequent in high altitudes than in low lying areas. The fever season is well marked in many districts and generally lasts from January to April. It is less prevalent in dry seasons and the cases that do occur are of a much milder type; and sheep that are kraaled high up on a hill side rarely become infected. Outbreaks are said to cease after the first frost.

Mode of Infection. It is generally believed that sheep suffer less from Blue Tongue when their wool is long than when newly shorn, and this is proved to a certain extent by the fact that when sheep are dipped in any of the good dips, it has a checking influence in the number of cases in an outbreak. This is probably due to the fleece becoming repellent, after dipping, to such insects that carry the infection. Kraals situated

on low-lying spots are infected with stinging gnats, mosquitoes, etc., and it is almost certain that insects of this nature carry the infection, for in winter and spring time, when these insects disappear, the disease also disappears.

Period of Incubation. When the disease is produced under natural conditions, the period of incubation is not known, but when experimentally produced, Veterinary Surgeon Spreule of Cape Colony, found it to be from two to five days.

How To Know It. In a typical case, the onset is marked by fever; the temperature, which may be erratic, ranging from 104 degrees F. to 106 degrees F., the morning temperature being much lower than one might expect. The fever period lasts from five to seven days, a decided drop being noticed when the eruption takes place. Prior to this it may be noticed that the sheep is getting thin and does not feed so well as usual. The first symptoms that attract attention are swelling of the lips and frothing at the mouth, and a catarrhal discharge from the nostrils, and on examination of the mouth, it is seen that the lining membrane is of a blue color. In mild cases the only indication may be sores inside the mouth and on the tip of the tongue. The tongue may be gangrenous, and in very severe cases become badly infected and of a dark blue color; the organ swells until it quite fills the mouth, making swallowing impossible. There is a copious discharge from the mouth; the lips become greatly swollen, while the usual discharge, growing profuse, dries on the nose, causing difficulty in breathing. Some times diarrhoea sets in, blood being passed, which is always a fatal sign, but as a rule, the fæces are almost normal except for some slimy mucous discharged along with them.

The lesions in the mouth heal in five to seven days, the appetite returns, the feet become tender, swollen and painful round the coronets; sometimes all four feet become affected, but commonly the front feet only. There is much thirst during both the febrile and eruptive stages, and sometimes when the sheep begin to feed well vomiting may supervene, especially if they have free access to water. The contents of the stomach, vomited, passes down the nostrils, and in many cases is inhaled into the lungs, thus setting up a fatal pneumonia, i. e., septic inflammation of the lungs. In young animals, especially if in poor condition the disease runs a very rapid and fatal course. The sheep are very much emaciated, and persistently lie down, although the feet may not be affected. The nose is brought round to the flank, the neck becomes twisted (Wry neck) and death soon takes place. In these cases the wool can be pulled out easily, but fortunately, such severe cases are exceptional.

After severe attacks recovery is slow, and death often occurs from debility, following upon an attack

Mortality. In outbreaks on the veldt, the mortality may range from five to thirty per cent, the loss to the flock master being very great in value of the wool, as many fleeces become patchy and ragged. But with suitable treatment the losses will not be so severe.

Causes. Seeing that Blue Tongue is not contagious, for contact of healthy with diseased sheep fail to produce it, no organism has yet been found in the blood, which, if injected into healthy sheep produce the disease, therefore, it must be clearly acknowledged that the sickness is caused by insects biting or stinging the sheep.

Immunity. After an attack of Blue Tongue, sheep acquire a considerable amount of immunity, but it has been proved by Theiler, Dixon and Spreule, of Cape Colony, that protection and immunity is also given by a hypodermic injection of an antitoxic serum which can be obtained from the various veterinary centres in the Colonies with full instructions. Much credit is due the above investigators in the experiments carried out by them.

What To Do. Give the sick animals complete rest, cool shady surroundings and succulent food. Water should be sparingly allowed as it induces vomiting. Applications of chlorate of potash and water, or of glycerine of tannin as described below are very good, and many farmers have met with great success by the use of Stockholm Tar and Sulphur. When the tongue and lips are very much swollen, scarification with a small lancet or needle gives relief.

Let the sheep have plenty of salt to lick.

Mode of Application. *Chlorate of Potash.* Take one ounce of chlorate of potash and dissolve it in two pints of rain water. Pour some of this solution into the mouth to act as a gargle. If a little is swallowed it will do no harm as it is not poisonous. Glycerine of tannin (obtainable from any chemist) and also the Stockholm Tar and Sulphur, are applied with a stiff feather, or gum brush, or even a piece of rag tied on the end of a stick to form a swab. Apply once daily.

The above applications may be used alternatively in their given order to obtain the best results.

We are not advocates of too much interference with sick animals, for some, such as cattle, sheep and pigs, do not like it. Unlike horses they are not so amenable and appreciative of attention therefore we say, let the attendant do what he has to do *once a day* and *do it well*, and we think it will generally be sufficient. Only in very bad cases should the dressing be applied twice a day.

Heart-Water in Sheep and Goats

What It Is. Heart-water is an inoculable disease due to a micro-organism so minute as to defy the efforts of all investigators to find it. Like the organism of horse sickness, it passes through all filters, though Theiler reports it did not pass through a Berkefield or Chamberlain filter, and he hopes very soon to be able to define it.

After inoculation of blood from a sick animal into a healthy one, it is found that from five to fifteen days elapse before any symptoms appear, and usually the time is from eight to ten days. After the manifestations of symptoms the disease runs on from two to six days, or even more. Heart-water in sheep is very similar to, if not identical with, the Heart-water of cattle, and can be transmitted by blood inoculation from sheep to goats and to cattle, or vice versa. The credit of these investigations is due to the late Dr. Hutcheon and his assistants and to Mr. Lounsbury, the Cape entomologist who has made clear the mode of spreading and dissemination of the disease.

Heart-water is met with only in the bush veldt, on which the breeding of high bred sheep and goats is distinctly disappointing. One happy feature about this disease is, that not all the bush veldt is equally bad. The worst parts are certainly the low lying. The season has some influence. In summer the disease is more prevalent and virulent, and the wise farmer knowing this, when a outbreak occurs among his flock, if on a low veldt, moves the sheep to a higher veldt. The disease soon comes to a standstill. It is not contagious, for once a flock was moved out of the Heart-water veldt to a high and noninfected area, and mixed among other sheep and goats, the latter would not take the disease.

Mode of Infection. Mr. Lounsbury, the Cape entomologist, found that Heart-water is carried by a certain species of tick, viz., the Bout tick, and, in his experiments, time after time, produced the disease artificially. He reports that the disease does not go from the female through the egg as is generally supposed, but is taken up either by a larva or lymph from a sick animal and so communicated, thus showing that while the disease is not contagious it is infectious.

The Bout tick breeds only in warm veldt where it finds protection in the bushes.

Heart-water is met with in the Transvaal O. R. C., C. C., and Rhodesia, and in fact any part where the Bout tick is found.

How To Know It. Fever accompanied by rise in temperature, may be the only symptom, and the animal suddenly dies, although it might have seemed quite healthy only a short time before. Usually, however, the temperature continues to rise even up to 106 degrees F. or 108 degrees F.

The animal may then stop feeding, become prostrated, and die without any typical sign of its suffering from Heart-water. Many cases show symptoms of brain trouble before death, denoted by a constant movement of the jaw, and of the tongue, as if it was chewing, extending the tongue and withdrawing it, and, in some cases, licking the ground. If tied to a post, it will turn round many times and suddenly fall. Fits set in, the neck being extended backwards, and the legs in regular motion. These symptoms pass away but only to return again, indicating the approach of death. Some animals bleed a great deal before death, while others pass quietly away. The symptoms of the digestive organs also vary greatly. Sometimes there is foam at the mouth and the throat may be slightly swollen, rumination (chewing the cud), may stop even before feeding, the bowels are usually normal, but sometimes costive, and again, diarrhoea may be present. Thus it will be seen that the symptoms vary considerably in different cases, but the brain signs are very indicative, and are caused by the diseased condition of the brain.

Post-Mortem. The principal lesion in Heart-water in sheep and goats is the increase of liquid in the heart-bag, hence the name Heart-water. This condition is also found in sheep and goats dying from other causes such as bad pasture, internal parasites, etc., but there is this difference, that in these latter cases one always has to do with a poor carcass, whereas in a good-conditioned animal the water in the heart sac, points to Heart-water as a specific disease. The changes occurring in other parts of the body or organs do not call for special mention as, except by the professional reader, they would be but little understood.

What To Do. *Prevention* by cautious methods and by protective inoculation.

At present no tangible forward movement has been made. Some investigators claim to have discovered a protective method by inoculation, but experiments made by the late Director of Agriculture and his very capable staff found them to fail, and so far, no true protective power is known. In the meantime flock masters will do well to watch their flocks carefully. Dipping is good during the period of infection, using any of the authorized sheep dips, so as to destroy any larva or lymph ticks that may be among the wool or mohair. Shift the kraals from low veldt to high veldt.

Tape-Worm in Ostriches

Tape-Worm in Ostriches. This very prevalent and often fatal disease is well-known to all bird farmers. It is sometimes confused with Frot-maag, or rotten stomach, but the latter generally occurs only after eating lucerne which sometimes ferments in the stomach and causes the so-called rot. A post-mortem shows the actual cause of death.

Symptoms of Tape-Worm. Ostriches that have worms soon show the signs and should be treated at once. The birds get thin and look dull and flabby, very much like a chicken that has gapes. The feathers and wings droop, and the bird mopes and lags behind in a big camp, and if in a small camp, it keeps by itself seeming to prefer solitude. It has no appetite and gradually pines and dies.

Treatment. In the Oudtshoorn C. C. district most farmers use alry, or aloes, as a remedy, also soot with meal. Some say this is a cure, and it is a fact that a certain specie of aloes is an excellent remedy, but this specie is not the common Cape aloes, but a small aloes with a long trailing pointed stem, thick as a finger. The leaves are about a foot long, one inch broad at thickest, tapering, serrated at edges with fine teeth, flowers on top of stalk one inch long and one-sixth of an inch wide and of a light color. The Kaffirs call the plant Ikalona. The leaves are cut off and the expressed juice only is used, in doses according to circumstances. The different farmers have their own mode of administering and their own ideas as to dose, etc., which vary in different cases.

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